

THE IRON AGE

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See page 51

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SEE
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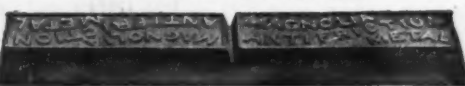


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THE IRON AGE

New York, Thursday, May 28, 1908.

United States Steel Sheet Piling.

An interesting installation of steel sheet piling has recently been completed in the foundation for the A. A. Pope building, Cleveland, Ohio, near the junction of Euclid avenue and Huron road southeast. The use of it solved a difficult building problem and enabled the builders to effect a very great saving in cost without sacrificing any of the features especially desired by the owner. In excavating the unusually deep basement water was encountered from a very thick and active vein of quicksand which had to be kept out until the foundation walls and grillage beams were in place. As putting in the foundations under compressed air would have been prohibitive in cost, it was decided to inclose the entire excavation in a large cofferdam, approximately 100 x 200 ft., extend-

were used on the balance of the driving, except a portion along the east side. During the first of the work the most difficulties were encountered, chiefly because the crews of the drivers were inexperienced and had to learn that steel piling must be driven differently than ordinary wood sheeting. This was corrected by a representative of the Carnegie Steel Company, who remained until this part of the work was completed. Before the end of the job the crews did some very good driving. At the outset a water jet was tried, but unsuccessfully, and practically all of the piling was driven without its use. Other experiments were tried, such as the use of toggles and blocking, but most of them were found to be unnecessary and were given up.

The work along the east building line required a drop hammer because the piling had to be driven within 8 in. of a party wall, and there was not sufficient clearance for



Driving the Piling for the Pope Building Foundation.—The Driver at the Right Is Working Along a Party Wall on the East Building Line and the One at the Left Is Working on a Staging at the Euclid Avenue End.

ing through the quicksand and penetrating the hard clay below. On account of the depth of the penetration however, and the nature of the quicksand, wood sheeting could not be used, so steel sheet was decided upon, the type chosen being the United States 35-lb. section, manufactured by the Carnegie Steel Company. The contract for the basement work up to the curb line was let to T. B. Bryson, 60 Wall street, New York City, who undertook to build this great steel cofferdam, and the driving of the piling was sublet to The Great Lakes Dredge & Dock Company, of Cleveland.

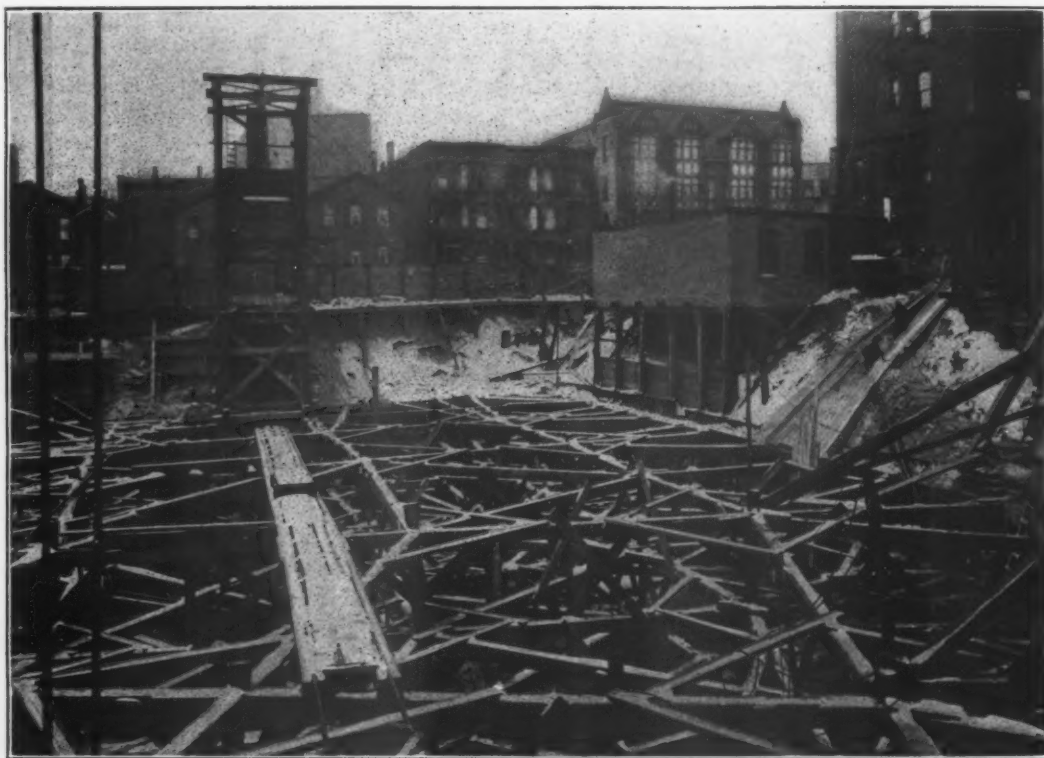
The vein of quicksand was met about 20 ft. below the curb line and extended 27 ft. deeper. The entire lot was first excavated to about 4 ft. above the quicksand. The piling, which was furnished in 35 ft. lengths, was then driven through the remaining 4 ft. of water sand and the vein of quicksand, finally penetrating 4 ft. into the clay below.

Work was commenced August 20, 1907, with one drop hammer, beginning at the middle of the west side of the building and working south. After a few days this hammer was changed to steam and steam hammers

using a steam hammer. Care had to be exercised to get the piling down straight and while the work was necessarily slow, it proved, upon excavation, to be some of the best done on the entire job. Not only were quarters cramped along this side, but the soil proved to be harder than elsewhere, and at times less than $\frac{1}{8}$ in. progress was made at a blow. However, this side when completed leaked less than any other part of the work.

Soon after the first hammer had started on the east building line, a second hammer, operating under steam, was started on the west side, working north. Connection was made with the first pile driven by a tee rail, the flange of which was chipped off to fit inside the jaws of the pile driven. This rail was driven to place and the next pile was entered over it. On this part of the work the fastest driving was done, the soil being softer and the crews by this time more expert. In one day this hammer drove 25 piles to the full length of 35 ft., which was the record.

When the second hammer reached Euclid avenue it was elevated about 12 ft. on a staging, and along this end the piles were driven until their tops were level with the



The Completed Installation of United States Steel Sheet Piling for the Pope Building and the Temporary Walling and Bracing.

staging. The hammer was then taken back over the same line, and by means of a follower the piling was driven down to the depth required. This method of driving was applied to decrease danger of a serious cave-in, to maintain a truer alignment and lessen the tendency of the piles to pull apart in driving. The two drivers met near the corner of Euclid avenue and the east building line, completing the circuit of the building.

As the excavation proceeded a system of heavy timber walling and bracing was carried down in horizontal tiers about 4 to 6 ft. apart, to the bottom of the final excavation and centering on large, round, wooden piles, driven at intervals in the central part of the excavation. This bracing held the steel cofferdam in place until the permanent walls and interior structure could be built. The walling timber used was 12 x 12 in., and the bracing was put in on about 8-ft. centers. During this work a single

centrifugal pump, discharging about 275 gal. per min., was used, but it was not necessary to operate it continually. Where caulking was necessary, oakum was used very satisfactorily.

This job proved the efficiency of steel sheet piling for work of this character, as it enabled constructing a very large and practically water tight cofferdam through treacherous soil, within which it was possible to excavate and set grillage beams and build outside foundation walls at much less cost than would have been possible under the pneumatic caisson system. It is impossible to lay down any very exact rules for handling and driving steel sheet piling, as the nature of the work is nearly always entirely different in different cases. In the present case, for instance, it is hard to say whether the results obtained by the steam hammer were better than those obtained by the drop hammer or vice versa, as the best work on the



A Near View of the Piling at the Euclid Avenue End of the Building, Showing Reinforcing Rods for the Concrete Wall.

job was about equally divided between the two methods; that which would produce the best results in one place might fail utterly in another place. The general adaptability of steel sheet piling to works of this character seems, however, to be established, and its use will probably increase in all manner of cofferdams, ditches, and locks, and especially in cases like the Pope Building, where a large open excavation makes it possible to handle the setting of foundations most economically and rapidly.

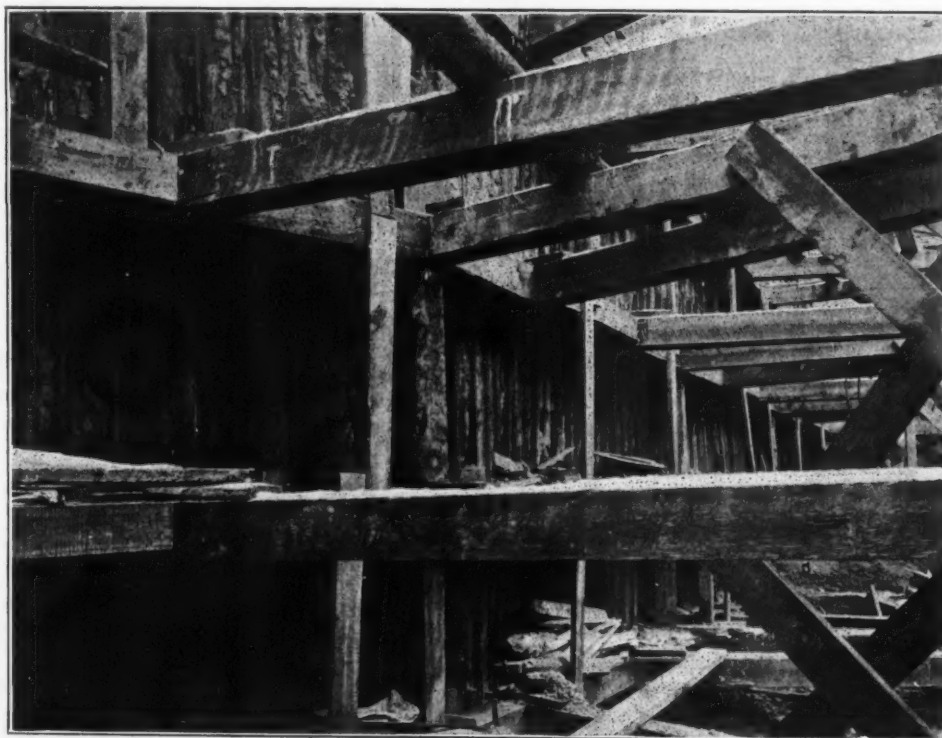
The Iron Ore Movement Slowly Gaining.

DULUTH, MINN., May 23, 1908.—Every day adds slightly to the iron ore movement on the lakes and to docks. Several of the railroads shipping large tonnages, notably the Duluth, Missabe & Northern, whose business will exceed that of any other Lake Superior line, have dumped almost no ore into docks, but are accumulating a few train loads daily at the receiving yards near the terminal. This railroad company was last year the victim of a dock strike, with a later organization of 700

The Chicago, Milwaukee & St. Paul Railroad is going after ore traffic on the Menominee with more vigor than ever. It is building tracks to the mines of the Norway and Vulcan section and to the Aragon, and is connecting its lines at several points with those of the Wisconsin & Michigan, which it now owns and which had been in touch with a number of mines under former ownership. The scheme of this road for the use of ferries for carrying ore trains from Peshigo the length of Lake Michigan to Chicago and elsewhere has been abandoned under the new ownership.

The Young's exploration at the North Armenia, Crystal Falls, is showing well under tests. At about 100 ft. from surface a crosscut is striking a lens of ore where it was expected. Twenty-five feet above this point the lens showed a width of 90 ft., and most of it a fairly good grade. It looks very much as though this property might make a mine. It is one of the few explorations still in progress in that region.

The Spring Valley Company's exploration, at Crystal Falls, has ceased, after sinking a shaft 75 ft. and cross-cutting considerably. A small seam of ore was encount-



A View Showing the West Building Line, Along Which the Fastest Driving of the Steel Sheet Piling was Done.

dock laborers affiliated with the other labor organizations in general. Its work this spring has been entirely on the open shop basis, and the union is not recognized. There has been no trouble at the docks and probably will be none. The Chicago & Northwestern has sent to Duluth and elsewhere for open shop men to take the place of striking dockmen at its own port, and is running its business on that basis. It is a settled fact that no more ore will be mined or shipped this year than can be handled on the open shop plan.

There is little change in the depressed feeling among ore miners, though it is recognized that conditions in general are brighter and ore shipments will be at a reasonable pace within a week or two. It is rather remarkable, and is in accord with the spirit of the winter rather than with that of the spring, that additional curtailment should now be taking place in the iron mining region. But such is the fact; more mines have gone on half time, and some smaller ones and a few left-over explorations and prospects are closing down.

More inquiry for ore is noted than at any time since fall. This is in part due, no doubt, to the improved outlook East, and in part, too, to the decision of the operators to maintain prices. There is little chance now of getting ore at lower prices, and this fact has had a steadying influence of no small consequence.

ered, but the company does not consider it sufficient encouragement at this time, though it may be taken up again later. This company is exploring the Kinney property at Spring Valley, and is opening what looks like a mine. Ore is being taken out and a stockpile is assuming size. Champion mine, at Champion, is now running half time.

No contract has been made by the Interstate Iron Company for stripping the Grant mine, at Buhl, by steam shovel, after the long and unsuccessful attempt to use an electric overhead grab system. Bids were in some time ago, but the property is still idle, and no attempt to begin operations, either by the grab or shovels, is manifest.

D. E. W.

The Oregon Electric Railway Company, Portland, Ore., has increased its capital stock from \$2,500,000 to \$10,000,000 preparatory to the addition of about 250 miles to its system of interurban roads. Work has already commenced on the Garden Home-Hillsboro extension, and should be completed by September 1; all material for this work is on hand. Other extensions will be made, but active construction on them will probably not be commenced until next year. Geo. B. Moffatt, New York, is president of the company; Guy W. Talbot, Portland, Ore., vice-president; Geo. F. Nevins, Portland, Ore., secretary, and H. W. Brower, New York, treasurer.

The Testing Society's Meeting at Atlantic City.

Announcement is made of the programme for the eleventh annual meeting of the American Society for Testing Materials which will be held at the Hotel Traymore, Atlantic City, N. J., June 23-27. The experience has been that previous meetings were crowded into too short a time, necessitating simultaneous sessions of different sections. The programme given below is a departure in that five days instead of three are given to the meeting and there will be but one session in session at a time. Provision has also been made for recreation time so that the meeting will not prove as strenuous as its predecessors. Wednesday evening is set aside for an engineering smoker and there will be no session on Thursday afternoon, which is reserved as a recreation period. On Friday evening an informal dinner will be given.

TUESDAY, JUNE 23, 3 P.M.

Minutes of the Tenth Annual Meeting.
Annual Report of the Executive Committee.
"Testing Is Not Inspection." W. A. Alken.
Report of Committee B, on Standard Specifications for Cast Iron and Finished Castings. Walter Wood, chairman.
"Method of Obtaining a Circular and Uniform Chill in Rolls." Thomas D. West.
Report of Committee H, on Standard Tests for Road Materials. L. W. Page, chairman.
"The Acceptance of Stone for Use on Roads Based on Standard Tests." R. S. Greenman.
"Fuel Investigations, Geological Survey: Progress During the Year Ending June 30, 1908." J. A. Holmes.
"The Structural Timbers of the Pacific Coast." R. Thelen.
Miscellaneous Business.
Election of Officers.

TUESDAY, JUNE 23, 8 P.M.

Annual Address by President Chas. B. Dudley: "Some Features of the Present Steel Rail Question."
"The Relative Corrosion of Steel and Wrought Iron Water Pipes." H. M. Howe.
Report of Committee U, on the Corrosion of Iron and Steel. A. S. Cushman, chairman.
"Electrolysis and Corrosion." A. S. Cushman.
"Characteristic Results of Endurance Tests on Wrought Iron, Steel and Alloys." Henry Souther.

WEDNESDAY, JUNE 24, 10 A.M.

"Preliminary Programme and Results of Tests of Steel Columns in Progress at Watertown Arsenal." J. E. Howard.
Discussion to be opened by J. E. Howard and Edgar Marburg.
Report of Committee F, on Heat Treatment of Iron and Steel. H. M. Howe, chairman.
"Some Practical Applications of Metallography." William Campbell.
Report of Committee Q, on the Tempering and Testing of Steel Springs and Standard Specifications for Spring Steel. J. A. Kinkaid, chairman.
"Tests of Staybolts." E. L. Hancock.
Report of Committee D, on Standard Specifications for Paving and Building Brick. L. W. Page, chairman.
"The Influence of the Absorptive Capacity of Bricks Upon the Adhesion of Mortar."

WEDNESDAY, JUNE 24, 3 P.M.

On Rails.

Report of Committee A, on Standard Specifications for Iron and Steel. W. R. Webster, chairman.
"Preliminary Programme and Results of Work on the Metallurgy of Steel in Progress at Watertown Arsenal." J. E. Howard. Discussion to be opened by J. E. Howard, W. R. Webster and J. P. Snow.
"A Microscopic Investigation of Broken Steel Rails: Manganese Sulphide as a Source of Danger." Henry Fay.
"Some Results Showing the Behavior of Rails Under the Drop Test, and Proposed New Form of Standard Drop Testing Machine." S. S. Martin.
"Types of Failures in the Base of Cold-Rolled Rails." P. H. Dudley.
"Rail Failures—Split Heads." M. H. Wickhorst.
"Some Notes on the Rail Situation." E. F. Kenney.

THURSDAY, JUNE 25, 10 A.M.

On Cement and Concrete.

Report of Committee C, on Standard Specifications for Cement. G. F. Swain, chairman.
"Portland Cement Standards, Especially for Tensile Strength." W. W. Maclay.
Report of Committee I, on Reinforced Concrete. F. E. Turneaure, chairman.
"Sands—Their Relation to Mortar and Concrete." H. S. Spackman and R. W. Lesley.
"Permeability Tests of Concrete with the Addition of Hydrated Lime." S. E. Thompson.
"Some Tests of Reinforced Concrete Beams Under Off-Repeated Loading." H. C. Berry.

"An Important Consideration Concerning Cement Analysis." S. F. Peckham.
"Formulas for Reinforced Concrete Beams in the Light of Experimental Data." W. F. Scott.

THURSDAY, JUNE 25, 8 P.M.

On Cement and Concrete.

"The Fireproof Qualities of Concrete." R. F. Tucker.
"Shearing Values of Stone and Concrete." H. H. Quimby.
"Some Methods and Records Used in the Laboratory for Testing Cement and Other Materials for the Subway and Elevated Railway in Philadelphia." S. A. Brown.
"The Influence of Fine Grinding on the Physical Properties of Portland Cement." R. K. Meade.
"Tests of Bond in Reinforced Concrete Beams." M. O. Withey.
"Cement and Concrete Work of U. S. Reclamation Service, with Notes on Disintegration of Concrete by Action of Alkali Water." J. Y. Jewett.

FRIDAY, JUNE 26, 10 A.M.

On Preservative Coatings and Lubricants.

Report of Committee C, on Preservative Coatings. S. S. Voorhees, chairman.
General discussion on the question, "Will 'Pure-Paint' Legislation Give Us Better Paints?" This discussion will be opened by C. D. Rinald, C. B. Dudley, E. F. Ladd, C. B. Heckel, J. Dewar, J. Peters and A. Somers.
"Certain Solubility Tests on Protective Coatings." G. W. Thompson.
"Analysis of Varnishes." P. C. McIlhenny.
Report of Committee N, on Standard Tests for Lubricants. A. H. Gill, chairman.

FRIDAY, JUNE 26, 3 P.M.

On Testing Machines and Apparatus.

"The Use of the Extensometer in Commercial Work." T. D. Lynch.
"Special Features of a Recently Installed 600,000-Lb. Universal Testing Machine." T. Y. Olsen.
"New Forms of Pendulum Testing Machines." T. Y. Olsen.
"An Autographic Recorder for Commercial Tension Tests." H. F. Moore.
Report of Committee G, on the Magnetic Testing of Iron and Steel. J. W. Esterline, chairman.
"Uniformity in Magnetic Testing and in the Specifications of Magnetic Properties." C. W. Burrows.
Report of Committee R, on Uniform Specifications for Boilers. E. D. Meier, chairman.

SATURDAY, JUNE 27, 10 A.M.

Forest Service Tests to Determine the Influence of Different Methods and Rates of Loading on the Strength and Stiffness of Timber: a. "The Purpose and Scope of the Investigations." McGarvey Cline. b. "Analytical Discussion of Speed-Strength Relation." H. D. Tieman.
"Manganese Bronze." C. R. Spare.
"Notes on the Desirability of Standard Specifications for Hard-Drawn Copper Wire." J. A. Capp and W. H. Bassett.
"The Structural Materials Testing Laboratories, U. S. Geological Survey: Progress During the Year Ending June 30, 1908." R. L. Humphrey.
"Effect of Combined Stresses on the Elastic Properties of Steel." E. L. Hancock.
Report of Committee P, on Fireproofing Materials. I. H. Woolson, chairman.
Report of Committee S, on Waterproofing Materials. W. A. Alken, chairman.
Miscellaneous Business.

The Consolidation in South Russia.

Although the consolidation of nine of the great iron and steel companies in the Donetz basin in Russia has not yet received the official sanction of the government, it is probable that it will go through. The Union Metallurgique Russe, which will be a union of what are chiefly companies backed by French and Belgian capital, is to have a capital of about 100,000,000 roubles (about \$51,000,000), divided approximately into equal parts of 6 per cent. preferred A stock and common B stock, at 187.50 roubles. The A stock is to receive 6 per cent. preferred dividends. Then an equal amount is to be paid to the common stock and subsequently all stock shares alike. Capital equal to 3,500,000 roubles entitles to one seat in the board.

The consolidation takes over all assets and liabilities and issues its stock to the individual companies in the following amounts: Dnieprovienné du Midi de la Russie and Metallurgique Russe-Belge, each, 22,500,000 roubles of A stock, and 5,500,000 B stock. Providence Russe, Ural Volga, Makewka and Taganrog, each, 7,500,000 roubles B stock. Briansk, 4,750,000 roubles A stock and 4,750,000 roubles B stock. Donetz-Juriefka, 3,200,000 roubles B stock and cash to cover floating indebtedness.

Hughes, 22,000,000 roubles cash. To meet the latter a further issue of A stock and of bonds is to be provided, in amounts as yet not determined.

Sliding Scale Agreements in Iron and Steel.

In a paper read before the New York Railroad Club W. V. S. Thorne, director of purchases of the Union Pacific Railroad and the Southern Pacific system, presented the following concerning the bases of sliding scale agreements in force between the above systems and the manufacturers of iron and steel and other metal products:

In making agreements with manufacturers it has been found most satisfactory, where practicable, to have the price of the finished articles purchased based on the average price of the raw material from which such articles are produced, as quoted, say, every three months in the most reliable trade journal, with the understanding that when the price of any finished article has once been agreed to, such price will thereafter automatically fluctuate in some fair proportion with the price of the raw material. For instance, the price to be charged for the following articles on orders placed by the railroad companies with the manufacturer during each quarter of any calendar year during the term of the agreement may be based, with proper differentials, on the average price of the raw material mentioned below (opposite the finished product), as quoted in the most reliable trade journal during the month or quarter immediately preceding the quarter of the calendar year in which the finished material is ordered:

Boiler tubes, dry pipes, safe ends, water grates and arch pipes.
Firebox steel.
Castings, steel and malleable iron.
Castings, gray iron.
Steel or iron forgings, for locomotives, rough or finished.
Rail joints.
Stay bolt and boiler brace iron.
Screw spikes.
Track spikes.
Track bolts and nuts.
Wheels, rolled steel.

Brake-beams.
Truck bolsters, if made of rolled steel.

Axles, steel, for cars or locomotives.

Tie-plates, rolled steel.

Steel plate, merchant steel bars, steel angles, tees, channels and beams.

Switches, frogs and crossings frogs, and repair parts for same.

Guard rails with adjustable clamp. Taper rails.

New cast iron car wheels and credit to be allowed for scrap wheels.

Springs, elliptic and coil.

Steel wire nails.

Wire: Barbed and plain; telegraph.

Box car metal roofs.

White lead and red lead.

Rabbit metal.
Car seals.

Journal bearings and brass castings, and credit to be allowed for scrap brass, &c.
Safety valves.
Locomotive whistles.

Gravity coppers.

Average price per gross ton of Bessemer pig iron at Pittsburgh, Pa.

Average price per 100 lb. of beams and channels at Pittsburgh, Pa.

Average price per net ton of steel forging billets at Pittsburgh, Pa.

Average price per gross ton of Bessemer steel billets at Pittsburgh, Pa.

Average price per 100 lb. of steel plates, merchant steel bars, steel angles, channels and beams at Pittsburgh, Pa.

Price of steel rails per gross ton f.o.b. Chicago, as quoted by the Illinois Steel Company, and price per 100 lb. of steel bars at Pittsburgh, Pa.

Price of steel rails, as above.

Average price per net ton of scrap cast iron car wheels f.o.b. Chicago.

Average price per net ton of spring steel in 1000-ton lots at Pittsburgh, Pa., as quoted by the Carnegie Steel Company.

Average price per pound of steel wire nails f.o.b. Pittsburgh, Pa.

Average price per pound of plain fence wire f.o.b. Pittsburgh, Pa.

Average price per pound of galvanized iron sheets f.o.b. Pittsburgh, Pa.

Average price per pound of refined corroding pig lead in 50-ton lots at St. Louis, Mo., as quoted by the American Smelting & Refining Company.

Average price per pound of desilverized refined pig lead in 50-ton lots at New York, as quoted by the American Smelting & Refining Company.

Average price per pound of casting copper f.o.b. New York, as quoted on the New York Metal Exchange.

Average price per pound of Lake copper at New York.

Gravity zincs.

Rubber insulated copper wire.

Manilla rope.

Creosote.

Average price per pound of spelter at St. Louis, Mo.

Average price per pound of Lake bar copper in 25-ton lots f.o.b. New York, and average price per pound of up-river fine Para new rubber, f.o.b. New York.

Average price per pound at New York of current spot manilla hemp and good current spot manilla hemp.

Average price of creosote as quoted in London, England.

These examples show how it is often practicable to make agreements between large consumers and producers, so that when mutually satisfactory prices have once been agreed to, some fair automatic method can be used whereby prices will adjust themselves to future conditions with as little unnecessary labor and friction as possible. Such a sliding scale basis mutually protects the purchasers and sellers, and in agreements extending over long periods avoids disputes and arguments as to how prices should be fairly adjusted when general conditions change. For the protection of the railroads a clause is embodied in nearly all such agreements, stating that in case the manufacturer at any time quotes lower prices on similar articles to any of his other customers he will likewise reduce prices to the railroads mentioned as regards orders they may place with him during the months in which he may have made lower prices to any of his other customers.

About one-quarter of all the continuing agreements thus far made by the director of purchases have had prices based on a sliding scale.

Freight Tariff Sheets Demanded by Shippers.

The Traffic Club of Pittsburgh, at a special meeting on the evening of May 11, called to discuss "Co-operation Between Carriers and Industrials in the Matter of Publication and Distribution of Freight Tariffs," adopted the following resolutions:

Whereas, There is a noticeable growing tendency on the part of some of the interstate carriers to discontinue supplying shippers with copies of freight tariffs, supplements and reissues by discontinuing the mailing list, and in other instances to discontinue, for reasons of economy or other reason, the compilation of numerous tariffs in one book, which latter have been of material advantage to shippers and to initial line agents, particularly where book rates have been used in combination, to make through rates, facilitating the prompt quotation of through rates, issues of bills of lading, &c., and

Whereas, Under the ruling of the Interstate Commerce Commission and of the courts, shippers are now charged directly with the knowledge of knowing what the legal rates of freight are, even though they have no voice in the making or publication of same; therefore, be it

Resolved, That the Traffic Club of Pittsburgh express its disapproval of any actions or contemplated actions on the part of the interstate common carriers which tend in the direction of making it more difficult by abolition of compiled books of freight rates or discontinuance of the mailing list, to ascertain the legal rates of freight, than has been the case prior to April 1; and be it further

Resolved, That because of the broad mutual interest that should exist between the shipping public and the carriers, it should devolve upon the latter as a moral if not a legal duty, to continue to assist shippers at least to the same extent that they have in the past, and if possible in the future to even a greater extent:

And we further recommend that the interstate carriers continue to keep shippers who have heretofore had that privilege upon their mailing list for tariffs, for the reason that with the volume of business now transacted in this country it is impossible and impracticable for shippers generally to obtain through rates of freight from tariffs posted in the freight houses or from local agents.

Two lake freighters were launched on Saturday, May 23, one at the Lorain, Ohio, yard, and the other at the Superior, Wis., yard of the American Shipbuilding Company. The former was named in honor of Price McKinney of Corrigan, McKinney & Co., Cleveland, Ohio. With the launching of these two steamers all vessels which the American Shipbuilding Company had under contract for 1908 delivery have now been placed in the water.

The New Machinery Club.

The Formal Opening of the Club on Thursday, May 21.

(With Supplement.)

One of the most representative gatherings of men in the machinery trade and allied industries ever held in this country took place on Thursday, May 21, at the quarters of the new Machinery Club of the City of New York, on the twenty-first and twenty-second floors of the Fulton Terminal Building, at 50 Church street, the occasion being the formal opening of the club rooms. It is estimated that nearly 3000 persons, consisting of members of the club and invited guests, attended the affair, which was in every way successful. The spacious quarters of the club, a plan of which was shown and the furnishings of which were described in *The Iron Age* of January 30, were crowded, but notwithstanding this fact it was proved that the cuisine was ample to take care of such an assemblage. The Reception Committee of 100 representative members in the trade had been designated by the Plan and Scope Committee to take charge of the guests and make them comfortable, and ably captained by the members of the Plan and Scope Committee and the House Committee, who had arranged the details, the visitors were well taken care of and left with an impression of the club which should be envied by similar organizations.

Some Details of the Reception.

The Plan and Scope Committee, which has been working for several weeks arranging for the reception, consisted of William B. Albright, Sherwin-Williams Company; W. P. Pressinger, Chicago Pneumatic Tool Company; H. B. Kirkland, National Metal Molding Company; J. R. Vandyck, Vandyck-Churchill Company, and T. N. Motley, T. N. Motley & Co. These gentlemen had selected the Reception Committee in conjunction with the Board of Governors of the club, and together with the House Committee arranged the details. Every member of the Reception Committee on his arrival at the club office was handed a badge attached to which was a note requesting the recipient to take his place in the main hall, meet the guests and introduce those who were strangers to some one who could offer them proper entertainment. An orchestra was stationed in the main dining hall to discourse music during the reception. The invitations were issued for 1 o'clock, but even before that time several hundred people were in the club's rooms, and the train of visitors continued until after 6 o'clock.

The National Association of Manufacturers which had been holding its convention, in New York and the National Machine Tool Builders' Association in Atlantic City had both adjourned the day before the opening, and many members of these organizations attended the reception.

The opening was decidedly informal, the only ceremony consisting of an address by George A. Post of the Standard Coupler Company. Mr. Post, at one of the meetings of the Plan and Scope Committee, announced that he would like to see the club opened like a bottle of champagne as against a bottle of stale beer, and his speech bubbled with oratory and wit in a manner that was illustrative of his remark. He said:

President Post's Address.

From a casual observation of what has been going on here this afternoon it might be inferred that the Machinery Club is open, but it isn't; not yet. True, the portals are swung wide; the corridors are thronged with distinguished guests and proud members, while strains of sensuous music percolate through the spacious and conveniently appointed suite. The blazing coals in the culinary, doing their perfecting work with the cuisine, under the deft manipulation of the chef; the staff, resplendent in its brand new outfit of togs, omnipresent and awe inspiring; the curling smoke from hundreds of fragrant perfectos; the hum of mirthful chat; the exchange of hearty felicitations, and the joyous sound of merry laughter, all seem to indicate that an opening of some kind has taken place. All about me are open countenances—open for anything, either solid or liquid.

But all these signs of activity are but harbingers. They resemble the eager hounds straining at the leash, or the prancing ponies scoring at the race track; somebody has

got to say something before they're off. The Machinery Club awaits the outpour to follow the application of its vocal corkscrew. For this occasion that's me. After me, the deluge—of club delights.

In the business game clubs are trumps. They are an absolute necessity in bringing men together under pleasant auspices, cementing friendships, affording conveniences for social entertainment and providing places of rendezvous for commercial conference. By binding together with the ties of fraternity large numbers of active, influential and intellectual men who learn to know one another well, the asperities of business strife are softened. Unity of action upon matters of common concern can thus be speedily effected, and, radiating from congenial club circles, influences for the betterment of commercial conditions may permeate widely and deeply.

Into this field of beneficent social and commercial endeavor the Machinery Club of the City of New York to-day makes its formal entry. It is the competitor of none; it is the coadjutor of all similar organizations. In this metropolis of our nation, with its millions of population to which men come upon errands of their crafts, there is room—yes, there is need—for this club and more like it. Here its members will find those conveniences that minister to their creature comforts. In its membership will commingle many of the men who make this city, State and nation great, and whose interests ramify throughout our country and foreign lands.

Its name is not intended to signify that its membership is restricted to those who are manufacturers of or dealers in machinery. It includes men in all kinds of occupations. It is like the Lawyer's Club, which is mostly made up of those who are not lawyers; or a Monday club which meets on Tuesday. The real reason, however, I suspect, for its name, is that it is intended to go. Machinery, if it is any good, goes. This club is all right, and is bound to go.

It is the hope and intention of the Machinery Club that it shall be known far and wide as a Mecca for those who seek good cheer. Let the tidings be spread abroad that here within these walls, on Manhattan Isle, is Laughland. If there be those whose nerves are too sensitive, whose moods are too sour, or whose mien is too austere to withstand contact with "live wires," they are not beckoned to these portals. Here shall good fellows, with merry quips upon their lips and the thrill of enthusiasm in their hand clasp, meet to eat, be sweet and merry. This club is not intended to be an emporium for the exploitation of canned grouches, nor as a mausoleum for "dead ones." It is a club for people with red blood in their veins and who cultivate the habit of smiling. Its atmosphere is to be redolent of the joys of comradeship. With its rooms located high in the heavens things hereabout ought to be quite heavenly.

You will note that there is an utter absence of barbaric splendor and garish coloring in our scheme of decoration. In such simple surroundings our membership will be safe from the prurient intrusion of sleuths who hunt for evidences of predatory wealth. As we wander along the corridors or sit about the rooms that are guiltless of any wanton waste of the precious woods of the forests, we shall have the intense satisfaction of knowing that we are true exemplars of that great virtue of the "conservation of our national resources." You know the President, 40 governors and a bunch of brilliant Americans have recently been reading essays down in Washington upon that subject. I am devoutly thankful that not one word has been wafted from the White House against the free and unlimited use of plaster. Patriots are we! Plaster for ours! We can look any old tree in the bark without a blush. We are neat, but not gaudy; we are proud, but not haughty. Our brightest ornaments will be our membership jewels, our greatest luxury the privilege of association with one another.

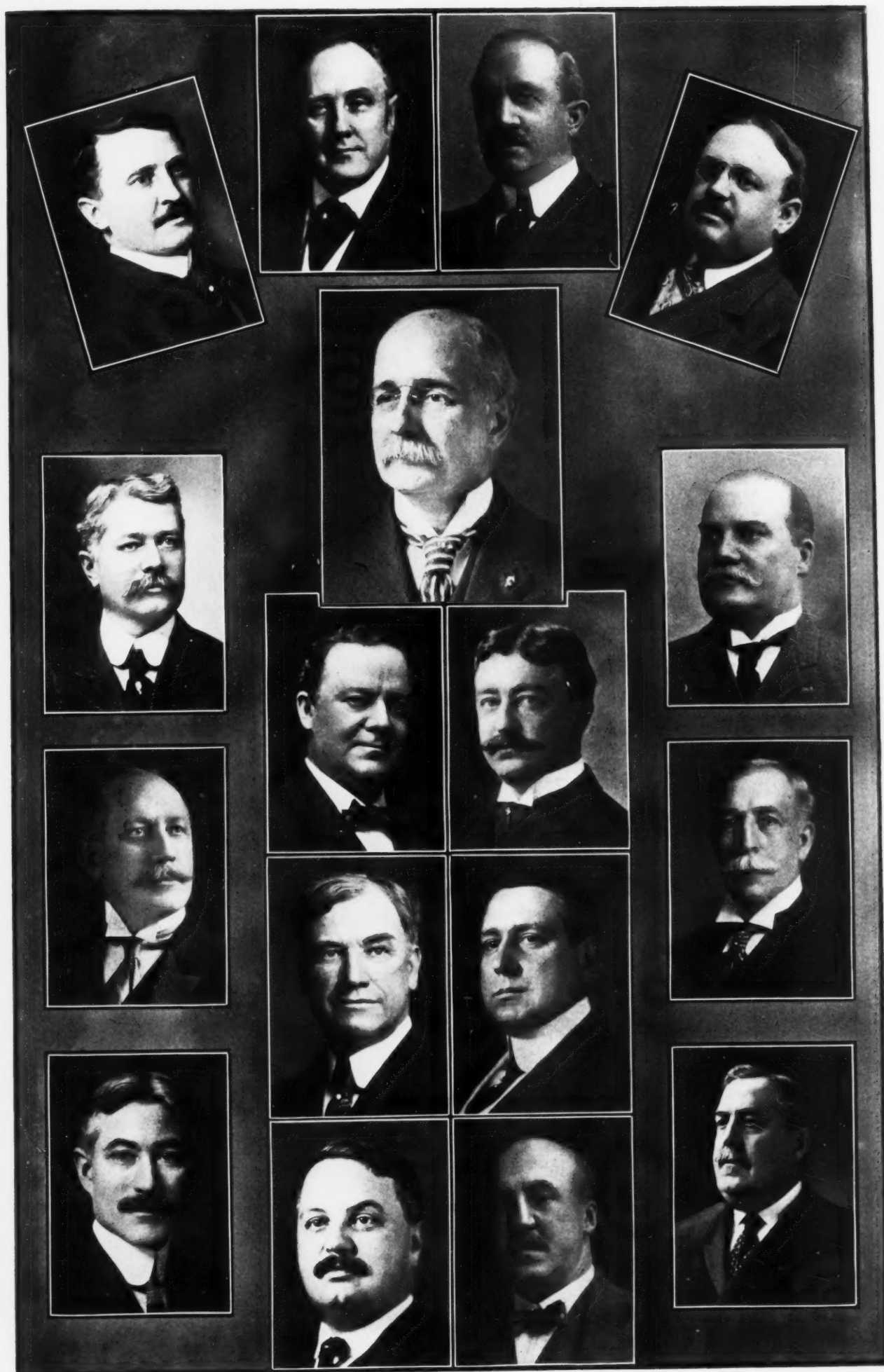
May the history of this club be a record of success and honor. May we who are enrolled among its thousand members in the beginning of its career long enjoy harmoniously its attractions and its advantages. Let us actively engage in the work of adding new members to its roster from among those who will give its strength and increase its social prestige. Let us hope that in future years, long after we who now attend its christening have lost our appetites for luncheon, the intrepid spirits who will then be doing momentous things in New York, greater than our fertile imaginations can now forecast, will gather about these tables, glad legatees of our work this day.

Gentlemen, the Machinery Club of the City of New York is now open! To our honored guests we accord an 18-carat welcome, and to the members we shout an exuberant "Hallo!"

A fine luncheon was served with other refreshments in the main dining room and grill room, after partaking of which the members and visitors went through the club's quarters, visiting the reception and smoking rooms, shower baths, barber shop, ladies' dining room, roof garden and other features of the club.

Features of the Rooms.

On every side were heard expressions of admiration of the manner in which the rooms were arranged and



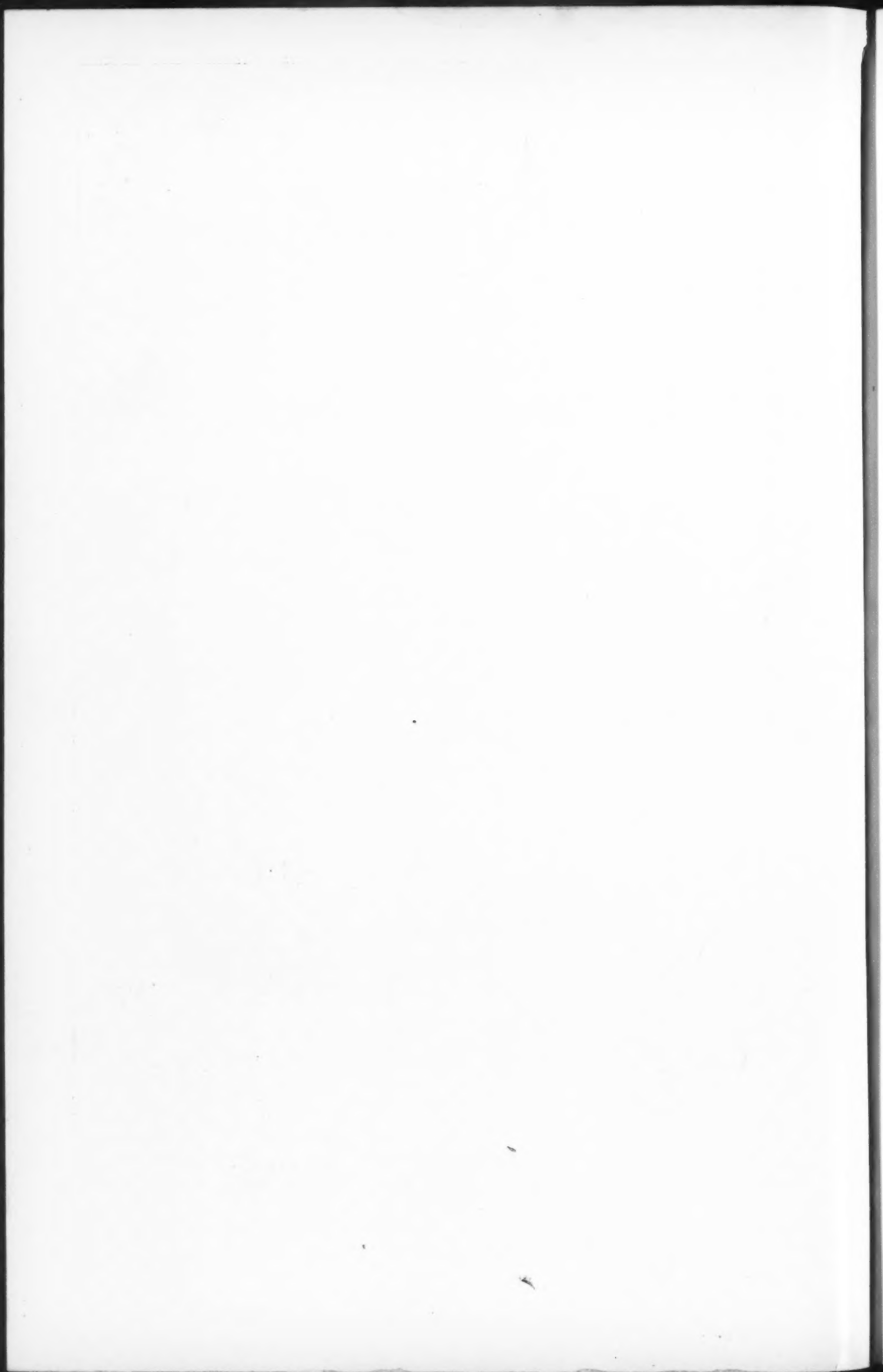
J. R. VANDYCK
WALTER L. PIERCE
O. C. GAYLEY
KENYON B. CONGER

GEO. H. POST
F. H. STILLMAN
H. L. SHIPPY
A. B. SEE
OTIS H. CUTLER

W. L. SAUNDERS
CHAS. A. SCHIEREN, JR.
W. P. PRESSINGER
WM. B. ALBRIGHT

H. B. KIRKLAND
THORNTON N. MOTLEY
HENRY PRENTISS
CHARLES A. MOORE

GOVERNORS OF THE MACHINERY CLUB OF THE CITY OF NEW YORK



furnished. The great club kitchen on the twenty-second floor was one of the appurtenances praised most highly. This section of the club quarters is directly under the roof, and among its most excellent features are ample light and air. One thing that impressed the visitor is the fact that the club is in every sense a dining club. There are no billiard tables or other forms of amusement provided, the larger part of the space being taken up by the dining arrangements.

The House Committee has paid particular attention to the fact that the main feature of a noon day dining club should be that the members can be served quickly and get back to their business, and it was pointed out to visitors that the club will be able to serve 700 people an hour. At the time of the opening of the club, it was announced that there were 1100 members, of which 500 were local members. The membership represents men in the machinery trade and allied interests in 130 cities, including cities in Mexico, Cuba, Japan and Europe. The members were particularly pleased with an innovation in the grill room which is a large table to be known as the club's "open table," at which out of town members and others who have but limited acquaintance in New York can find members who will join in conversation with them, as it is understood that diners at this table will engage in conversation without the formality of an introduction.

The Machinery Club movement was begun April 4, 1907, when F. H. Stillman, president of the Watson-Stillman Company, called a meeting of the trade at the rooms of the Board of Trade and Corporation. More than 200 men in the machinery and metal trades and allied industries responded, and a committee of 27 was appointed to form the organization.

What makes the club especially advantageous to business men as a luncheon resort is its accessibility to many parts of the city. The location is in close proximity to all railroads leading into New York and it can be reached from the railroad terminals of Jersey City by the tubes under the river, which are to be opened shortly, and an underground passage is being constructed from the basement floor of the building to the Fulton street subway station at Dey street. Both the Sixth and Ninth avenue elevated railroads are to have stations in the building, and it has been said that it is possible to go to any important point in the United States from the Machinery Club rooms without going out from shelter.

The officers of the organization are as follows:

F. H. Stillman, president; R. C. McKinney, vice-president; Walter L. Pierce, treasurer; W. Seton Henry, acting-secretary.

Governors: O. C. Gayley, Pressed Steel Car Company; Geo. A. Post, Standard Coupler Company; Walter L. Pierce, Lidgerwood Mfg. Company; F. H. Stillman, Watson-Stillman Company; C. A. Moore, Manning, Maxwell & Moore; H. L. Shippy, John A. Roeblings' Sons Company; T. N. Motley, T. N. Motley & Co.; Henry Prentiss, Prentiss Tool & Supply Company; H. B. Kirkland, National Metal Molding Company; W. P. Pressinger, Chicago Pneumatic Tool Company; A. B. See, A. B. See Electric Elevator Company; W. H. Marshall, American Locomotive Company; R. C. McKinney, Niles-Bement-Pond Company; E. H. Wells, Babcock & Wilcox Company; W. L. Saunders, Ingersoll-Rand Company; Otis H. Cutler, American Brake Shoe & Foundry Company; J. R. Vandyck, Vandyck-Churchill Company; Kenyon B. Conger, Hudson Companies; Wm. B. Albright, Sherwin-Williams Company; Chas. A. Schieren, Jr., Chas. A. Schieren & Co.

House Committee: T. N. Motley, chairman; Charles A. Schieren, Jr., George Howels, Ingersoll-Rand Company; Edw. H. Benners, Crown Casting Company; Percy A. Ware, *The Iron Age*.

Membership Committee: J. R. Vandyck, chairman; George L. Gillon, Watson-Stillman Company; Charles B. Crook, Lidgerwood Mfg. Company.

Executive Committee: F. H. Stillman, chairman; R. C. McKinney, Walter L. Pierce, George A. Post, Henry Prentiss.

At Wilmington, Del., May 14, an order was issued by the United States Court directing that out of the funds and registry of the court 40 per cent. of the amount

of the bonds of the Diamond State Steel Company be paid, and that a credit of the amount be stamped on the bonds held by John B. Newkirk, of Philadelphia, and presented in part payment of the purchase price of the plant. The property was acquired by Mr. Newkirk at public sale some time ago, for \$575,000. The total distribution will be \$399,600, of which sum \$232,800 consists of credits. The balance will be paid in actual cash. Mr. Newkirk had made application for such a distribution.

The Grant Motor Driven Rivet Spinning Machine.

A new rivet spinning machine, the special feature of which is the vertical motor drive, shown in the illustration, has been brought out by the Grant Mfg. & Machine Company, Bridgeport, Conn. In common with the company's other machines, the working parts are specially



The New Motor Driven Rivet Spinning Machine Made by the Grant Mfg. & Machine Company, Bridgeport, Conn.

shaped twin rolls in the holder at the lower end of the revolving spindle, which when brought in contact with the rivet shank, produce a condition that causes each roll to revolve independently on its axis, thereby rolling or swedging the rivet shank into the form desired. The spindle is direct connected with the motor shaft, which does away with all belting and makes the machine more compact.

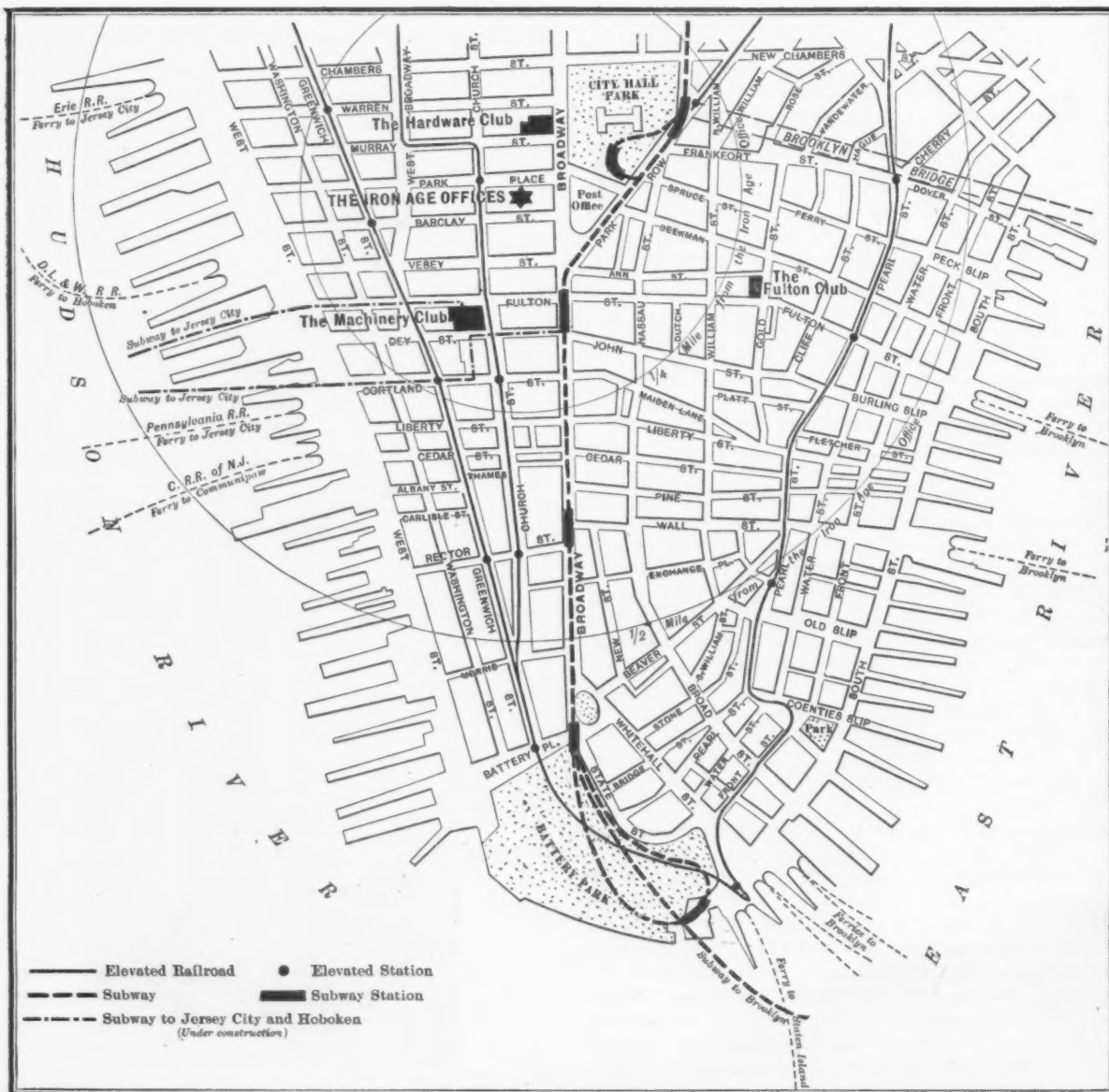
The machine will handle rivets up to 5-16 in. The spindle speed is 1200 to 2000 rev. per min.; the height from the floor to the spinning tools is 44 in.; the distance from the column to the spindle, 6 in.; the maximum distance from the table to the spinning tools, 25 in.; the over all height, 65 in., and the table 8 by 8 in. The floor space required is 17 by 21 in., and the weight of the machine, including the motor, is 415 lb. The machine is furnished fitted with a horn instead of a table, if desired.

Our Offices and the Trade Clubs.

The opening last week of a new club appealing to those interested in the machinery, iron and metal trades, the Machinery Club, suggests the proximity of the offices of *The Iron Age* to the clubs in the iron and allied trades and transportation lines of lower New York City. The accompanying map shows the location of *The Iron Age* offices and the three prominent clubs. The Fulton Club, at the corner of Gold and Fulton streets, is frequented by many in the metal trades; the Hardware Club, in the Postal Telegraph Building, at the corner of Murray street and Broadway, has long been an important meeting place for New York City and out of town hardware men, and

stone's throw from *The Iron Age* offices. A wider circle, or one of half a mile radius, reaches to ferries of the four principal railroads, the Erie, the Delaware, Lackawanna & Western, the Pennsylvania and the Central Railroad of New Jersey.

The Terre Haute, Robinson, Olney & Southwestern Railway Company is the title of a corporation recently organized to construct a railroad northeast from Mt. Vernon, Ill., to the Wabash River, from which point it is to be extended to Terre Haute, Ind., by another company yet to be organized under the laws of Indiana. The proposed line will be a steam road, which will have southwestern connections at Mt. Vernon. The distance between



Our Offices and the Trade Clubs.

the new Machinery Club, in the Fulton Building, bounded by Fulton, Church and Dey streets, will be the most prominent gathering place in the country for those in the machinery and allied trades.

Within a radius of a quarter of a mile from *The Iron Age* offices are located two express stations and one local station of the rapid transit subway reaching northward well into the Borough of the Bronx at two different places, and south and eastward to Flatbush avenue, Brooklyn, where connections have recently been made with the Long Island Railroad Company, furnishing rapid transportation facilities to a large part of Long Island. Not only these, but the four elevated railroad lines of Manhattan have stations within this circle as well as the terminals of the principal elevated and surface car lines of Brooklyn at the Manhattan end of the Brooklyn Bridge. The Post Office is not more than a

Terre Haute and Mt. Vernon is about 125 miles. It is stated that contracts for the first section of 100 miles between the Wabash River and Mt. Vernon have been let, work to be completed in 18 months. H. C. Pugh, Terre Haute, is president of the company; S. C. Wilson, vice-president; F. W. Lewis, secretary; Norman Moss, treasurer, and Baxter L. Brown, St. Louis, Mo., chief engineer.

The Kansas City Galvanizing & Mfg. Company, Kansas City, Mo., has recently completed a new building, 65 x 130 ft., of brick and cement, with truss roof, for its galvanizing plant, in which a complete equipment of automatic machinery for handling metals is now being installed. The plant, which will have a capacity of 30 tons a day, is expected to be ready for operation by June 10, and business is already being booked.

Customs Decisions.

Arched Purves Furnaces.

A long drawn out litigation has been brought to a close regarding the classification under the tariff act of arched Purves furnaces by a decision of the United States Circuit Court of Appeals at Philadelphia. The appellate tribunal sustains the contention of F. B. Vandegrift & Co., the importers of the merchandise, that the articles are dutiable properly at 2 cents a pound under the first section of paragraph 152 relating to boiler tubes or flues. The court denies the claim of the Government that the articles are "furnaces" under another provision of paragraph 152 with duty at the rate of $2\frac{1}{2}$ cents per pound. The court finds the Purves furnaces to be corrugated steel cylinders, or tubes, about 4 ft. in diameter and perfectly plain within; that they are intended to be made into furnaces by the insertion of an elaborate structure and the application of much labor. The case came before Judges Gray, Dallas, and Buffington. Judge Gray writes the decision which is coincided in by Judge Dallas, while Judge Buffington dissents. Judge Gray says that, although the articles were invoiced as "furnaces," and so described by those using them, no trade designation has been shown as comes within the rule applicable in customs cases. After referring to the fact that the cylinders or tubes are fitted up after manufacture with plates, fire brick, grate bars and other adjuncts, the decision in part says:

When thus completed they undoubtedly were, and were properly called, furnaces. A number of witnesses were also introduced, whose testimony was to the effect that these tubes or cylinders, in the condition in which they were imported, were spoken of by those using or importing them as furnaces, and in fact they were so invoiced in the present case; but this convenient mode of designating them by the use to which they were to be put cannot change the essential character of the article itself. No such trade designation has been shown as comes within the rule applicable in such cases. In fact, the conditions were not such as to allow of a trade designation, as these articles were not kept in stock or dealt in as articles of general merchandise, but were only made to the order of those requiring them. To classify these articles as furnaces would, we think, be doing violence to the ordinary meaning of language, which should always, in the first instance, be resorted to in the interpretation of legislative acts, as well as be in violation of that canon of construction of taxing laws which forbids any tax burden to be imposed except by clear and unequivocal language.

Automobiles and Parts.

Importers of automobiles and their accessories have won an important victory before Judge Platt in the United States Circuit Court, who holds that the Government has no right to assess duty as entireties on automobiles and tires imported separately. The court rules that the customs authorities are not justified in exacting duty on the two items as "manufactures of metal," at 45 per cent., but should properly levy the 45 per cent. rate on the machine only, while the tires should pay 30 per cent., under the rubber schedule. This decision resulted from protests lodged with the court by the Auto Import Company, Archer & Co., and Massenet & Derouche, New York, who determined to test the Government's classification. It was shown in the testimony that in many instances the tires ordered by customers vary, and that, while they accompany the machine, they are not attached, but are packed for shipment separately. Under these circumstances, the importers asked the court to reverse the authorities in their classification of the articles as entireties.

Tin Disks.

Declaring that the Government's assessment of duty on small tin disks is practically prohibitive, the United States Circuit Court of Appeals at Richmond, Va., has reversed the rulings of the Circuit Court and of the Board of Appraisers, and grants duty at 45 per cent. The disks were imported from Canada by Frank H. Shalvus, Baltimore. They are by-products of the manufacture of tin cans, being the round pieces cut out of the top of the cans to provide the aperture by means of which the cans are filled. The Government returned the disks for duty at the rate of $1\frac{1}{2}$ cents per pound under the tariff provision for "tin plates." The importer alleged that the classification imposed by the

Government was so excessive as to render further importations impossible.

In upsetting the heavy duty, Judge Dayton says that the imposition of the tax of $1\frac{1}{2}$ cents a pound has the effect of making the disks pay what is equivalent to 200 per cent. Under these circumstances, the court believes that Congress did not contemplate the assessing of the small disks as "tin plates." The judge says that under the metal schedule, at 45 per cent., the disks are taxed equitably with tin and other metal importations. He accordingly reverses the heavy tax approved of by the lower court and the Board of Appraisers.

Agate Scale Bearings.

During the past week the Board of United States General Appraisers handed down several minor decisions. Claims for reduction in the duty on agate scale bearings from 50 to 10 per cent. were made by the Toledo Computing Scale Company, R. C. Hahn & Co. and G. W. Sheldon & Co. The protests were all overruled, the higher rate imposed by the Government being affirmed.

Safety Device Medals Awarded.

Three gold medals and the diplomas of the American Museum of Safety Devices were awarded at a luncheon meeting at the Engineers' Club, New York, May 25. Charles Kirchhoff, chairman of the Committee of Direction, presided. Dr. W. H. Tolman, Director of the Museum, stated that the exposition was a working model for a permanent museum, and that some of the more important exhibits had been donated to it. There are 10 such museums in Europe. To push this work, an educational committee, under the chairmanship of Bishop Potter, has been organized; another valued member is Cardinal Gibbons.

Dr. Tolman announced that the gold medal offered by the *Scientific American* for the most meritorious invention in transportation at the exposition was awarded to the Rich Marine Fire Detecting and Extinguishing System, with honorable mention to the Welin Quadrant Davit Company, and the Simmen Automatic Railway Signal Company. The jurors were Prof. F. R. Hutton, chairman; H. H. Westinghouse, Cornelius Vanderbilt, Samuel Sheldon, George Gilmour, John Hays Hammond, and Stuyvesant Fish.

For the best invention in mines and mining, the gold medal offered by the Travelers' Insurance Company, Hartford, went to the Droeger Oxygen Apparatus Company, according to the decision of W. R. Ingalls, Charles Kirchhoff, and Prof. Henry S. Munroe, the jury.

For motor vehicles, either on land or on the water, Francis H. Richards, the inventor, offered a gold medal, which was given to the Non-Explosive Safety Naphtha Container Company (McNutt patents), with honorable mention to the Rutherford Wheel Company. The jury consisted of Dr. S. S. Wheeler, Caspar Whitney and A. G. Batchelder.

The exposition at the rooms of the Museum, 231 West Thirty-ninth street, New York, closed Wednesday of this week. It has attracted technical men, railroad officials, architects, and industrialists, all of whom have expressed their satisfaction at its high character and the hope that the movement for a permanent museum may be successful.

The Dutcher Company, Milwaukee, Wis., which recently assigned, for the benefit of its creditors, has, through a reorganization, been succeeded by the Dutcher Steel Casting Company, incorporated with a capital stock of \$100,000. It is stated that the stock of the new company is held principally by creditors of the old Dutcher Company. The plant has resumed operations. Wm. O. Goodrich is president of the new company, G. A. Goodrich vice-president, John H. Hetherington secretary-treasurer and general superintendent.

Approximately \$5,000,000 is stated to be the cost of the coal consumed by the Atlantic battleship fleet when it will have finished its cruise around the world.

The Westinghouse Double Flow Steam Turbine.

The first installation of the new double flow steam turbines developed by the Westinghouse Machine Company, East Pittsburgh, Pa., is that in the Brunot Island power plant of the Pittsburgh Railways Company. This station supplies current to most of the street railroad system and a large part of the lighting in Greater Pittsburgh. The turbine equipment shown in Fig. 1 is more than double the previous capacity in reciprocating engine driven units and occupies less than half as much floor space. The engine room originally contained five 1500-kw. Rice & Sargent cross compound condensing engines, direct connected to Westinghouse generators; three direct current 550-volt dynamos and two 600-volt two-phase alternators running in parallel with the other plants of the system. Space remained for three additional engine driven units of the same size, but these would have been insufficient to meet the increased demand for power. By adopting steam turbines instead, one 3000 and three 5000 kw. units have been installed, and there is still room for another of 5000 kw. The generators are 11,000-volt three-phase alternators, and are operated in parallel with the engine driven alternators. The smaller unit has been in operation nearly a year; the larger ones are in course of erection. The extra boiler capacity required will be provided in a new boiler house to be built parallel with the existing one, which will contain six 400-hp. Babcock & Wilcox water tube boilers, equipped with Westinghouse new model Roney mechanical stokers. The boilers will be arranged in pairs, discharging into eight independent stacks of 7 ft. internal diameter and 250 ft. high.

Condensers and pumps are located beneath the engine room floor between the turbine foundations. A short duct connects the exhaust of each turbine to an Alberger condenser of the centrifugal jet type, Fig. 2. The circulating and discharge pumps are mounted on the same shaft and driven by a Westinghouse compound single acting engine. A steam driven two-stage dry air vacuum pump is also provided for each turbine. Cooling water is pumped to the condensers from an intake tunnel extending the length of the power house, at one side of the foundations, and the discharge from the condensers empties into a similar

tunnel parallel to the intakes. As the Ohio River occasionally rises as high as 28 ft. above the tunnels, an adjustable gate is provided in the intake tunnel leading from the screenhouse to a large central well in which

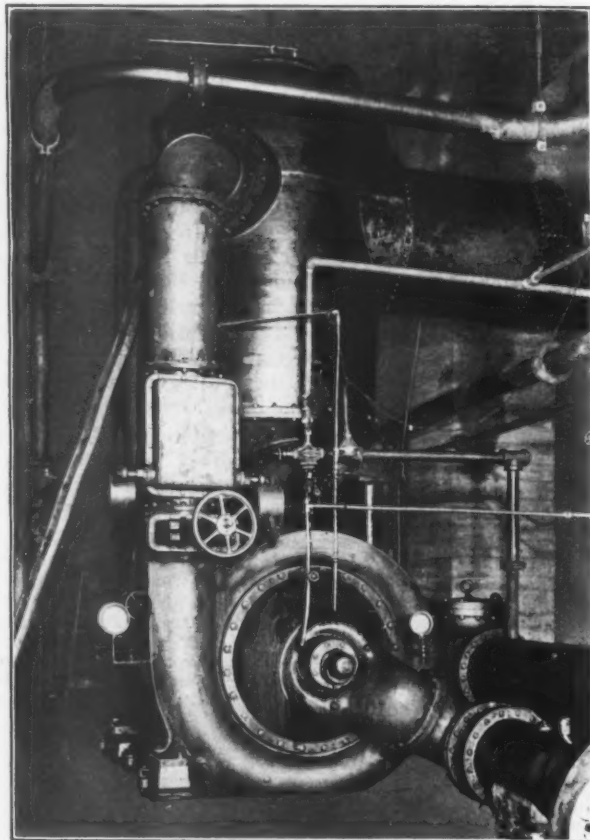


Fig. 2.—One of the Alberger Condenser Equipments in the Basement.



Fig. 1.—A View in the Brunot Island Power Plant of the Pittsburgh Railways Company, Showing the New Westinghouse Double Flow Turbines.

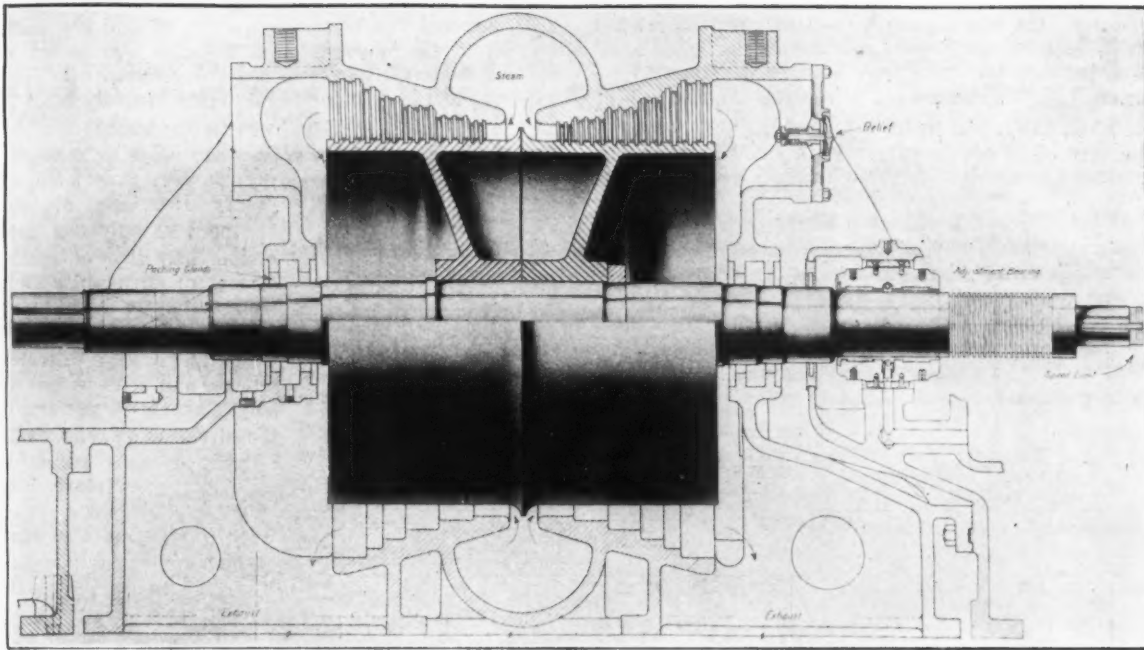


Fig. 3.—Sectional View of a Low Pressure Double Flow Turbine.

the water level may be maintained at the desired point to prevent flooding the condensers.

The turbine foundations are interesting. Each unit rests upon reinforced concrete plates supported by six reinforced concrete columns, thus giving ample space around the condenser, which could have been placed entirely within the turbine foundations had this been necessary. The concrete employed to construct a foundation for one of the 1500-kw. cross compound engine units would be sufficient to build the four foundations required by the 18,000 kw. in double flow turbines.

The Turbines.

The greatest interest centers in the turbines because of their design. The double flow principle is essentially a modern development, arising from mechanical considerations. It is not altogether new, as the original Parsons turbine, constructed in 1880, was of the simple double flow type. In modern hydraulic work the double flow principle is very largely employed to produce a rotor running in perfect axial equilibrium. In small machines, however, the advantages of the double flow principle are not as important as in the large, because they are not mechanically so necessary, but the economy of two small machines is not likely to be as good as one of twice the capacity. In turbines of very large size proportions exist more favorable to the attainment of high economy. The double flow turbine may thus be regarded as the result

of a demand for turbine generating units of large capacity running at high speeds.

The combined impulse and reaction principle of the steam expansion, together with the double flow construction as embodied in this machine, offers special advantages, and the double flow construction will hereafter be the standard in all Westinghouse machines of over 5000 kw. capacity. For smaller capacities the single flow Parsons principle is still considered the best, and in sizes below 3000 kw. the Westinghouse-Parsons construction will be continued. Thermodynamically the Parsons is the most efficient, but because of the mechanical advantages inherent in the double flow type the two types as now built will be of practically equal net economy. The condition is largely brought about by the higher relative speeds permissible in large capacity machines, with which the Parsons element works to so much better advantage as to compensate for the poorer inherent economy of the impulse section. This section may be considered somewhat as a power producing reducing valve from which a lower efficiency may be countenanced.

To best comprehend the advantages of the double flow construction it may be well to examine first the low pressure double flow turbine shown in Fig. 3. This is of the simplest possible construction, consisting of two identical Parsons turbines placed end to end, taking steam at the center and exhausting at both ends, hence the axial

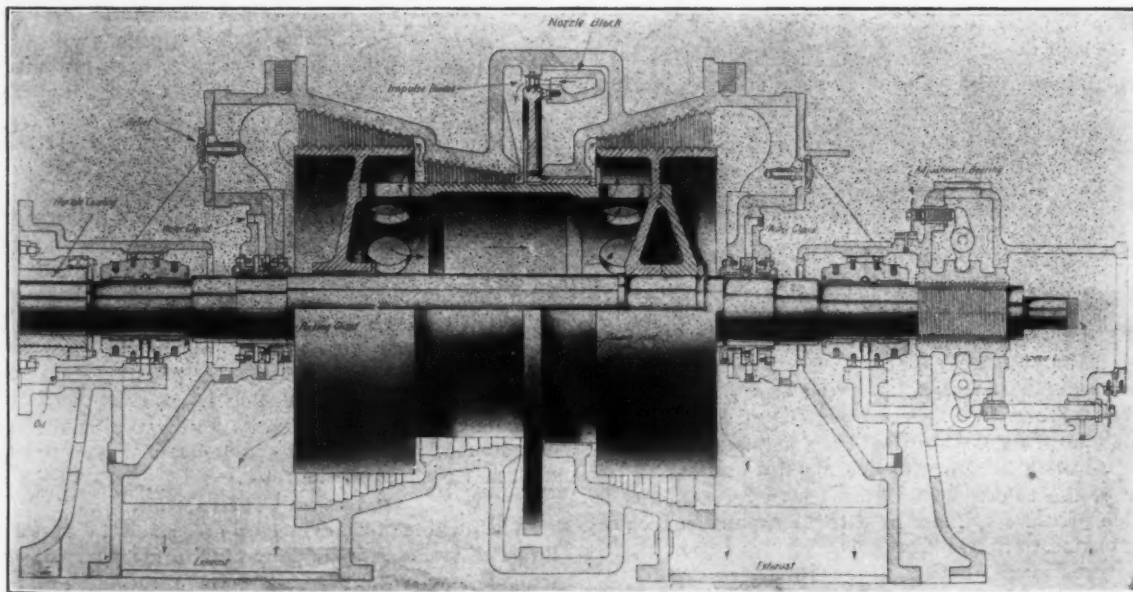


Fig. 4.—Sectional View of a High Pressure Double Flow Turbine.

thrust of the steam on the blades in one half counteracts that in the other and dummy, or balance pistons are not required. As these low pressure turbines are designed to operate on the exhaust steam from a noncondensing reciprocating engine it is possible to tie the engine and turbine together electrically, and under such conditions a governor on the turbine is unnecessary. With this exception the low and high pressure double flow turbines are practically

quence of the increased speed permissible due to reduced span between bearings; the making of the low pressure section in two opposed parts in axial equilibrium, permitting moderate length of the low pressure blading; the exposing of the cylinder to no higher pressure than 75 lb. as a maximum nor high temperature steam; the admitting of a relatively large volume per pound of steam to the first Parsons section, avoiding the very short blades necessary with large diameters;

the need of only one balance piston, and this of moderate diameter; an impulse element well suited to high pressure and superheat which works well into the dimension scheme and reduces the shaft length nearly 50 per cent. and the dividing of the exhaust connections which pass through the bed plate, largely reducing their size.

Steam enters the turbine through a flanged opening in

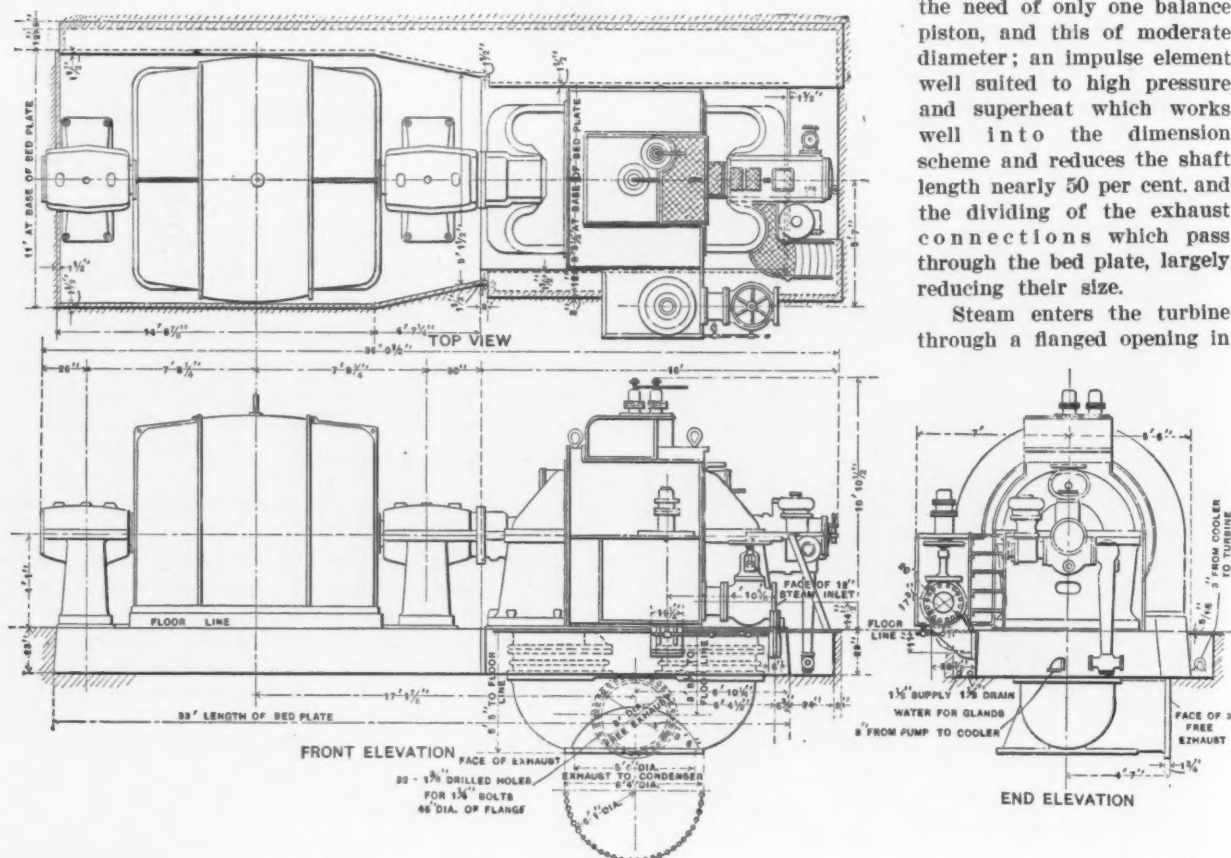


Fig. 5.—Plan and Elevations of One of the 5000-Kw. Turbo-Generators in the Brunot Island Station.

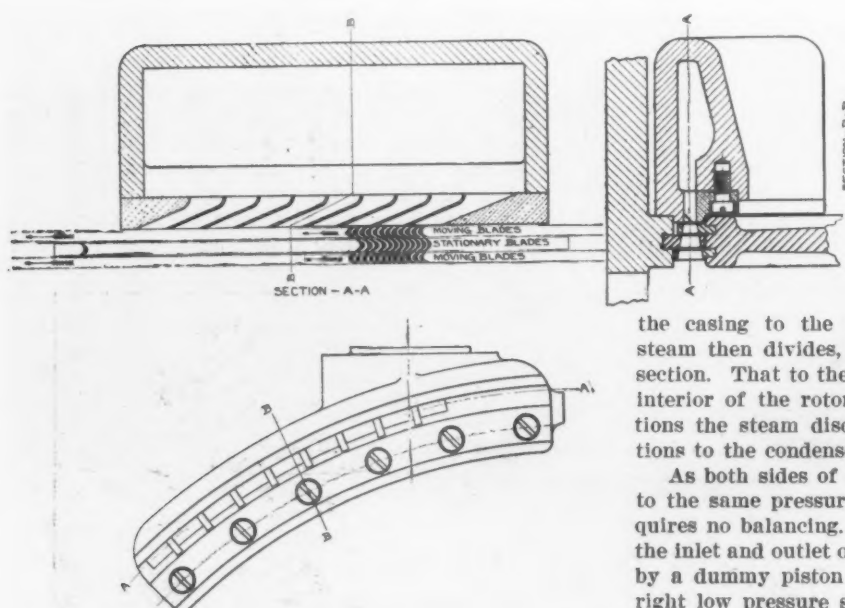


Fig. 6.—Detail of Blading and Nozzles of a Double Flow Turbine.

the same in principle, but the latter, as shown in Fig. 4, has in addition a high pressure impulse element at the center of the rotor. This element may be compared to the high pressure cylinder of a triple expansion reciprocating engine.

Features of the double flow turbine are greatly reduced bulk and weight of individual parts as a conse-

quence of the increased speed permissible due to reduced span between bearings; the making of the low pressure section in two opposed parts in axial equilibrium, permitting moderate length of the low pressure blading; the exposing of the cylinder to no higher pressure than 75 lb. as a maximum nor high temperature steam; the admitting of a relatively large volume per pound of steam to the first Parsons section, avoiding the very short blades necessary with large diameters;

the need of only one balance piston, and this of moderate diameter; an impulse element well suited to high pressure and superheat which works well into the dimension scheme and reduces the shaft length nearly 50 per cent. and the dividing of the exhaust connections which pass through the bed plate, largely reducing their size.

As both sides of the impulse wheel disk are subjected to the same pressure, it produces no end thrust and requires no balancing. The difference of pressure between the inlet and outlet of the intermediate section is balanced by a dummy piston between the impulse wheel and the right low pressure section. To maintain the axial position of the rotor an adjusting bearing is fitted on the right end of the shaft. A number of collars are turned in the shaft, between which fit brass rings fixed in the adjustment blocks. The upper and lower halves of the bearing may be adjusted by micrometer screws to rectify the axial position of the rotor.

Details of Construction.

The double flow cylinders are made in upper and lower halves, each a single casting of symmetrical design without longitudinal flanges except those for bolting the two parts together. After the flanges have been planed

and drilled the castings are rough bored, and then "seasoned" with high pressure steam until local casting strains are removed. They are then assembled and finish bored, with the boring bar running in the bearing housing to insure a truly concentric bore. Manholes at each end of the cylinder permit examining the interior, and relief valves in each of the manhole covers prevent the pressures in the exhaust passages rising to a dangerous point if the condensing apparatus fails or the atmospheric relief valve sticks. A steam and air tight packing gland is applied at each end of the cylinder where the shaft enters and is described later in detail.

Beneath the turbine a Y connection, containing two corrugated copper expansion joints, connects the separate exhausts to the main exhaust nozzle, as may be seen in the longitudinal elevation of the 5000-kw. Brunot Island

with a thin copper sheathing. The copper resists corrosion and the steel provides great strength. For reinforcing long blades an improved blade lashing is now used. Comma shaped holes are punched in the blades near their outer ends and a similarly shaped lashing is laced through these holes. After the blades have been caulked into the rotor or stator, the thin part of the lashing is sheared over by a tool, which wedges it into the contracting space between the adjacent blades, acting as a strut, while the lashing wire itself acts as a tie, thus securely interlocking the blades and preventing vibration. The short section remaining in the blade after being sheared off acts as a key to prevent a broken blade from injuring adjacent rows. The uniformity secured by this method is shown in Fig. 8.

A water sealed gland, shown in Fig. 4, is fitted to

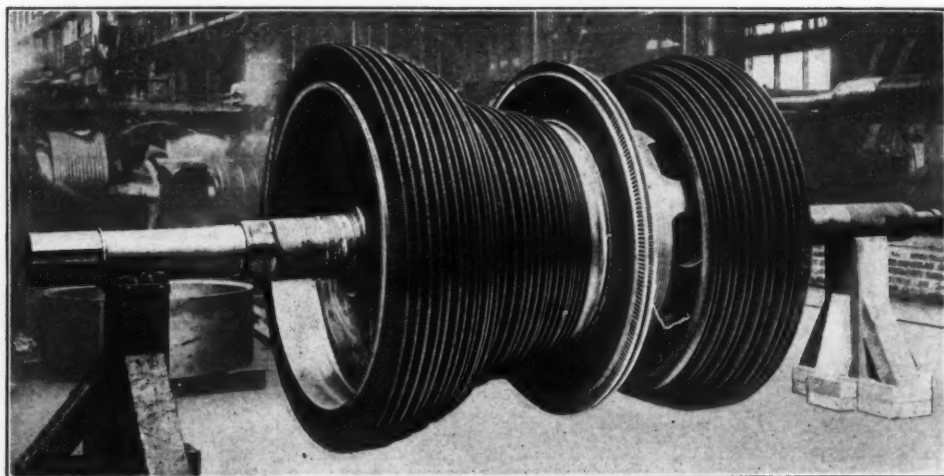


Fig. 7.—Rotor of a Westinghouse High Pressure Double Flow Turbine.

turbo-generator, shown in Fig. 5. These expansion joints allow movement of the turbine casing due to expansion and contraction. An atmospheric exhaust nozzle on the side of the exhaust Y permits noncondensing operation.

The rotor, as Fig. 4 indicates, consists of five cast steel members pressed on a through shaft and locked to prevent movement. To the opposite end of the rotor is fitted a bronze bushing surrounding the shaft, permitting it to move axially without appreciable resistance under any differential expansion of shaft and rotor body. The impulse element is a flanged cast steel disk. The flange at the base is grooved and forms the balance piston for the intermediate Parsons section. A typical arrangement of blading and nozzles is shown in detail in Fig. 6.

The nozzle block is a separate casting and, receiving steam from the governor valve, restricts high pressure and high temperature to a comparatively small casting, which is free to expand and contract with changes of temperature and may easily be designed with ample strength. As the steam is expanded in the impulse element to not less than about half the initial pressure, divergent nozzles are unnecessary and simple straight sided nozzles are used. The entire nozzle block may be removed in one piece, and the nozzle walls may be readily renewed if necessary. The area through the buckets of the impulse element increases to provide for the decreasing steam velocity in each rotating wheel.

Except for its division the low pressure Parsons section is the same as in a single flow turbine, consisting of a series of rows of moving and stationary blades, increasing in height to allow for the increased volume of the steam. The velocities from stage to stage remain practically constant. The blades are inserted in grooves cut in the spindle and cylinder body, and are held in place by caulking the soft spacers, or distant pieces inserted in the grooves between the blades. The diameters of the low pressure section are chosen so as to permit using the same size blades in both intermediate and low pressure sections, thus simplifying the blading considerably, as may perhaps be judged from Fig. 7, a view of a rotor.

The blading material is a special metal known as Monnot or duplex metal, consisting of a steel core covered

each end of the turbine shaft where it passes through the exhaust casings. The packing consists of a small centrifugal pump propeller running in an inclosed chamber to which water is supplied under a head of about 10 ft., which is slightly in excess of the head due to the centrifugal force set up by the impeller blades. At starting any external leakage water is caught on circular troughs and drained away. The action of this gland is to main-

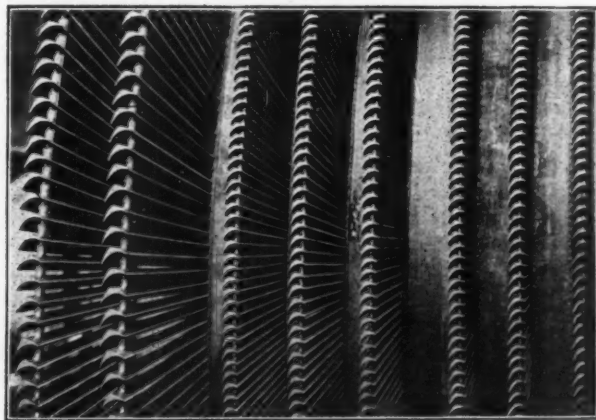


Fig. 8.—A Detail Showing the Uniformity of the Blading.

tain a solid mass of water around the periphery of the impeller, which effectually prevents air entering the condenser or steam escaping to the atmosphere when running noncondensing.

In all turbines running at or below 1800 rev. per min. self-aligning babbitt lined bearings are used, of sufficient area to require no forced lubricating system. Each is made in two parts, supported in a spherical seat by four pads, by which the bearings and rotor can be centered to preserve uniform clearance. The oil supply is delivered at the top of the journal at the point of minimum pressure, which insures even distribution of oil. All bearings are supplied with oil from a central reservoir, under a

head of about 5 ft. From the bearings the oil is drained through a strainer and returned through a cooler to the reservoir by a small rotary oil pump driven from the turbine shaft by worm and bevel gearing. The cooler contains a nest of flat coils, through which cooling water is circulated.

Between the generator and turbine shaft, to provide for any slight changes in the alignment of the respective bearings, a flexible coupling is used which has two sleeves, one keyed to each shaft. These sleeves have projecting teeth which engage with projections on a surrounding collar. The latter is in two parts to permit removing either shaft without disturbing the other. The coupling allows considerable variation in the shaft alignment and permits the generator to float in its bearings, limited only by a retaining ring at each end.

If the turbine tends to race the main throttle valve is automatically closed by a spring balanced plunger at the end of the main shaft. Normally the spring holds the plunger to its seat, but excessive speed causes the end

action which would follow running a considerable period at constant load. A small relay steam piston does the actual work of moving the turbine valves, thus relieving the governor of practically all work except moving a small pilot valve. For convenience in synchronizing and distribution of alternating current load, the governor is fitted with a small motor and weight, by which the governor spring tension may be controlled from a distance, usually from the switchboard.

Manganese Steel for Coil Shields on Lifting Magnets.—An example of how the development of one industry helps another is shown in the adoption of manganese steel disks for coil shields on the lifting magnets made by the Cutler-Hammer Clutch Company, Milwaukee, Wis. The shield is a flat disk, fastened to the under side of the lifting magnet for the double purpose of protecting the magnetizing coil and interposing an area of nonmagnetic material between the two poles. Ordinary steel being

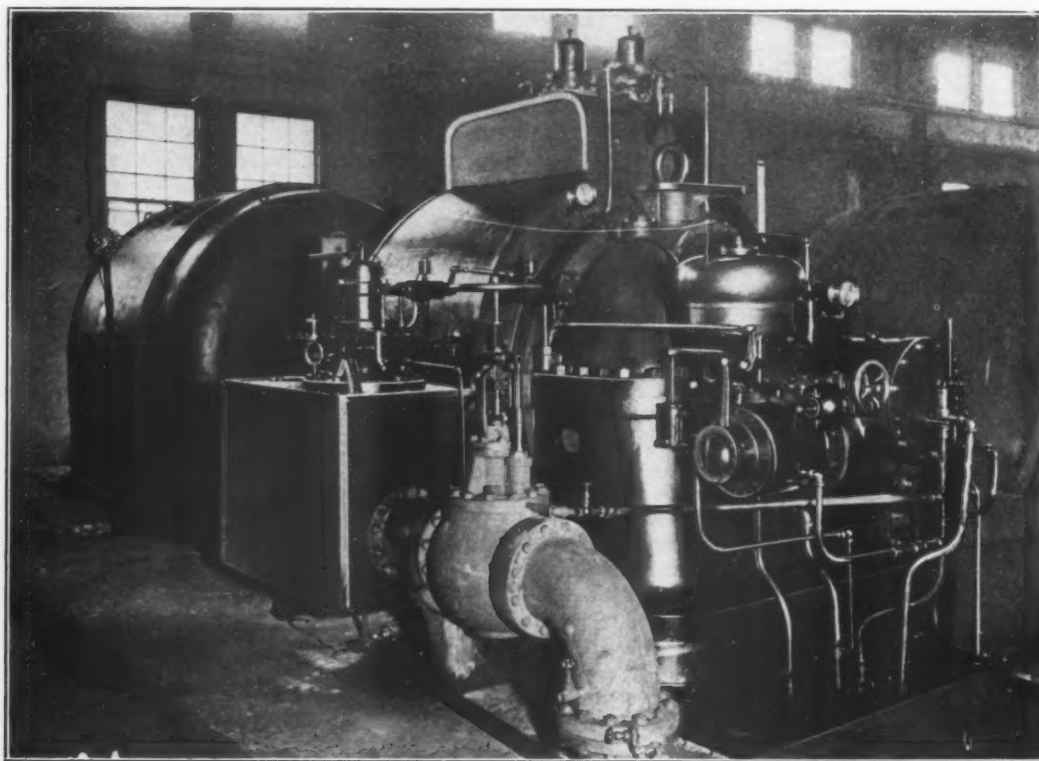


Fig. 9.—A View of the Steam End of One of the Turbo-Generators, Showing the Governor and the Steam Admission Side.

of the plunger to protrude and trip a relay valve, which operates a quick closing throttle, by releasing the pressure beneath its piston. Any accident to the pipe connections of the speed limit would instantly shut down the turbine.

The governing is by the familiar "puff" or "gust" system, a constant number of admissions per minute being made with a variable duration of admission according to the load. To maintain an equal distribution of work between the several stages of a multi-stage turbine, governed by individual nozzle control, the nozzles in each stage should be governed simultaneously. With the throttling method of governing, stage pressure control has been found unnecessary. Where the expansion in each stage is but a small part of the total expansion range, as in the Parsons turbine, the initial and terminal pressures of each stage rise and fall together, resulting in a fairly constant pressure ratio at each successive expansion, the nozzle and blade areas being reasonably correct through a wide range of load and pressure distribution. The impulse section is properly proportioned for a wide range in load, and may be governed without intermediate nozzle control without sacrificing economy at fractional loads. The governor is of the sensitive fly ball type, as may be seen in Fig. 9. All parts are kept constantly in motion to avoid friction of rest and prevent sluggish

a magnetic metal cannot be used, as it would serve to conduct the magnetic lines of force from pole to pole instead of compelling them to seek a passage through the material to be lifted. Because of its nonmagnetic properties brass has heretofore been used for this purpose. It is now found that manganese steel seems to be an ideal metal for this service, since it is not only nonmagnetic like brass, but is also very much harder—so hard, in fact, that the continued contact of pig iron or other material on the lifting surface of the magnet makes no impression on it. All of the 50-in. magnets recently furnished by the Cutler-Hammer Clutch Company to a number of steel mills in the Pittsburgh District are equipped with manganese steel coil shields instead of the brass disks formerly used.

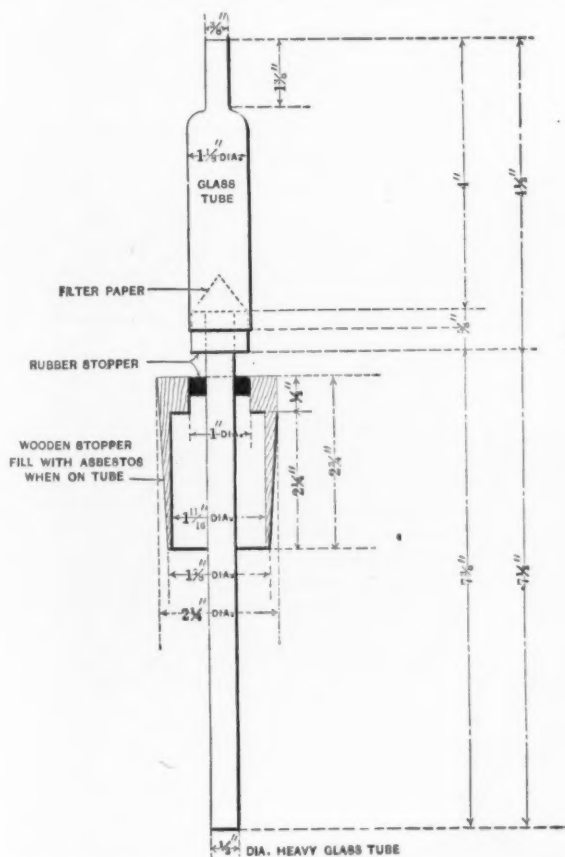
A Large Gas Producer Plant.—At the Duquesne Steel Works of the Carnegie Steel Company 6 of the 18 additional open hearth furnaces for which appropriations have been made were completed recently. Preparatory to their operation the new gas producer plant was started up. The producer building is 1140 ft. long, and contains 64 gas producers of the Hughes' mechanically operated type, built by the Wellman-Seaver-Morgan Company, Cleveland, Ohio. This is the largest installation of this producer yet made. The producers are mechanically fed.

and the removal of ashes is automatic. The coal consumption for the 64 producers will be about 1500 tons a day. As rapidly as the necessary changes can be made, all the open hearth furnaces will receive gas from the new producers, and the use of natural gas will be abandoned.

A Method for Determining the Amount of Dirt in Gases.

The method described below for determining the amount of dirt in blast furnace and other gases has been worked out under the direction of E. L. Messler, general superintendent of the blast furnace department of the Jones & Laughlin Steel Company, Pittsburg, Pa., by Frederick Brinker, assistant chief chemist. It is regarded one of the most accurate thus far devised for this purpose, the results of a two-years' trial having been found to check very closely with actual practice.

A 9-c.m. filter is folded so as to fit inside the large glass tube in the shape shown in the drawing. The rubber stopper on the glass tubing fitting inside the filter



A Method for Determining the Amount of Dirt in Blast Furnace and Other Gases.

presses it to the side of the large glass tube, thus making a tight joint. The wooden stopper through which the glass tubing passes is hollowed out to make it more pliable; also to give more heating surface to the glass tubing and thus prevent the separation of moisture in the tube. A little asbestos is put in the bottom of the stopper to keep the heat from the rubber stopper. The stopper is now placed in the 2 1/4 in. hole in the gas main where the sample is to be taken, care being taken to get it straight so that the flow of gas passes the end of the glass tubing, which must be straight and smooth. The end of the tube with the filter in it is connected to a aspirating bottle with rubber tubing. One cubic foot of gas is drawn through the filter in about 25 min. The filter is taken out of the tube, dried and weighed. The difference between this weight and the weight of the filter is the amount of dirt in one cubic foot of gas. If a little dirt has collected in the glass tubing on its way to the filter, this must be added to the filter before it is dried and weighed.

The filtering tube can also be connected to a gas meter which is operated by a small suction pump, the meter running at the rate of about 3 cu. ft. per hour. By this means a test lasting several hours can be made, which gives much better the average amount of dirt in the gas. When making a long test, the tube with the filter in it must be kept warm (which can be done with one or two 16 candle-power electric lights) so as not to allow the gas to be reduced in temperature to the dew point, as moisture would then separate and clog the filter and burst it.

The National Association of Manufacturers.

The National Association of Manufacturers, at its concluding session May 20, went on record as favoring the "let us alone" policy. This resolution was unanimously adopted:

Resolved, The National Association of Manufacturers believes that we have had excess agitation under the guise of moral crusades, such as child labor, railroad reform and similar movements, which are excellent and desirable in reasonable measure, but not so when pressed to the hazard of vested interests and property. We therefore recommend rest and quiet upon such questions, at least until normal business is restored.

The resolution was presented to the convention by James W. Van Cleave, its president. He said that the manufacturers appeal for the square deal of business, not of politics. They felt that grave injustice had been done to them in the crusades that have been waged.

James A. Emery, general counsel of the National Council for Industrial Defense, attacked President Roosevelt for his utterances about the improper use of injunction. He declared that the President had impeached the whole judiciary without setting forth facts on which a single judge could be impeached. "For four or five years," said he, "there has been a general attempt to push this labor legislation, inimical as it is. For three years past it has been stated and reiterated in executive messages that the right of injunction has been misused against labor, and that there has been wide abuse of the injunction. Now, let us look into it and find out if this is true. How many injunctions, for instances, have been issued by the United States circuit courts in the last five years? There have been issued only 328 injunctions, and only 20 of them in labor disputes." He added that what we want in this country now is not more laws, but more respect for the law.

The association passed resolutions against repealing the national bankruptcy act of 1898.

Gifford Pinchot, head of the United States forest service, delivered an address along the lines of his recent address before the conference of governors, but appealing to the manufacturers personally to lend their aid in conserving the nation's resources.

James W. Van Cleave, as president, and all of the other old officers were re-elected.

An Allis-Chalmers Pump Test.—An official test recently made on two Allis-Chalmers screw pumping engines, together with four centrifugal pumping units installed in the Thirty-ninth street pumping station of the Sanitary District, Chicago, resulted in the award of a bonus to the maker of about \$100,000. The contract called for 95,000,000 ft.-lb., while the test developed a duty of 145,000,000 ft.-lb. A bonus of \$1000 was offered for every 1,000,000 ft. lb. in excess of the contract price, that sum representing but a small proportion of the saving in operating expenses to be effected by every 1,000,000 ft.-lb. increase in the engines' efficiency; it is figured, therefore, that, despite the large bonus to be paid, the Sanitary District is the gainer under the contract. The installation represents an aggregate maximum capacity of 2,160,000,000 gal. of water and sewerage every 24 hr. The test was run under the direction of Henry A. Allen, representing the Sanitary District; Louis E. Strothman of the Allis-Chalmers Company, and W. E. Jennings. Twenty observers checked up the work for the Sanitary District and 16 others were present representing the contractors.

The Gas Process of Case-Hardening.

BY J. F. SPRINGER, NEW YORK.

What promises to be a revolution in the methods of case-hardening is the gas process recently developed by Adolph W. Machlet, superintendent of the American Gas Furnace Company, Elizabeth, N. J., after years of experiment and study. The machine which accomplishes the results is being exploited by the firm mentioned. A distinct concern, the American Metal Treatment Company, also located at Elizabeth, N. J., is engaged in executing case-hardening orders for the trade by this process of gas carbonization.

Before entering upon a description of the machine and the process which it effectuates, it may be well to consider the present-day methods and their defects. Case-hardening is ordinarily performed on articles of iron or low-carbon steel to convert their surfaces into steel containing sufficient carbon to enable hardening to be done by heating and chilling. The essential thing, then, is to impregnate the surface with carbon. Ordinarily, the first step is accomplished by packing the pieces in some carbonaceous material, such as wood charcoal, scrap leather, raw bone, bone charcoal, &c. A wrought or cast iron case is used to hold the work and the packing. In packing, care is exercised that no article is in contact with the iron of the case or with the rest of the work, and that uniformity of compactness is secured to insure uniformity of carbonization.

For high grade results the packing must be done by a skilled man, which is manifestly a considerable item in the expense. The case containing the packed articles is covered by a cap, and the whole sealed with clay or other suitable material. The entire package is now raised to a temperature of about 1500 degrees F. This heating causes the iron or mild-steel articles to expand to a condition receptive to carbon from the surrounding and heated packing. It is necessary, as a rule, to keep the case in the furnace for 18, 24 or even 48 hours, but nothing is gained by prolonged heating after the carbon in the packing is exhausted. Probably the packing nearest an article, and which is soonest exhausted, not only hinders carbon passing from the more distant packing but absorbs it. The carbon already absorbed by the surface of the article undoubtedly also hinders the further penetration of car-

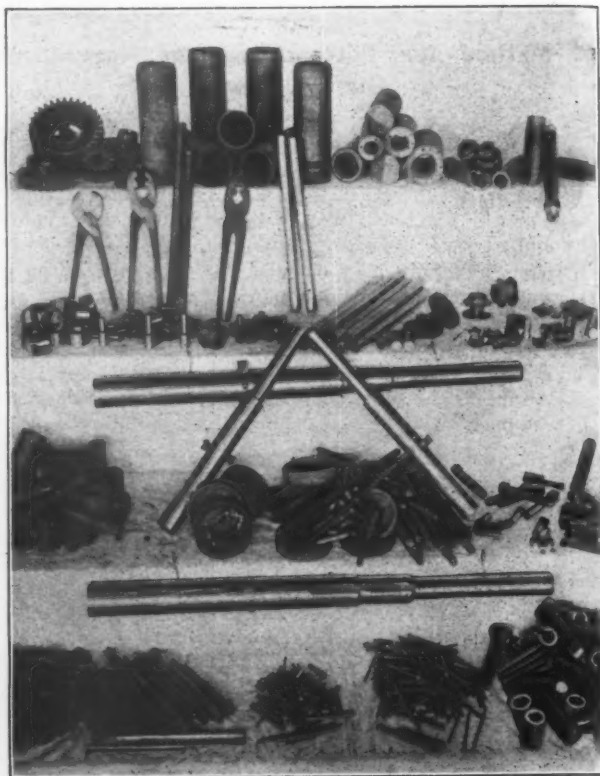


Fig. 2.—Examples of Articles Case-Hardened by the American Metal Treatment Company.

bon. At any rate, the depth of penetration is not in proportion to the time of the furnace heat—*i. e.*, double the penetration requires more than double the time. To carbonize to a considerable depth, repacking, one or more times, is sometimes resorted to. The case is removed and the whole allowed to cool, when it is repacked with fresh material. This is very costly, involving the expense of more or less skilled labor, loss of time, and the reheat-

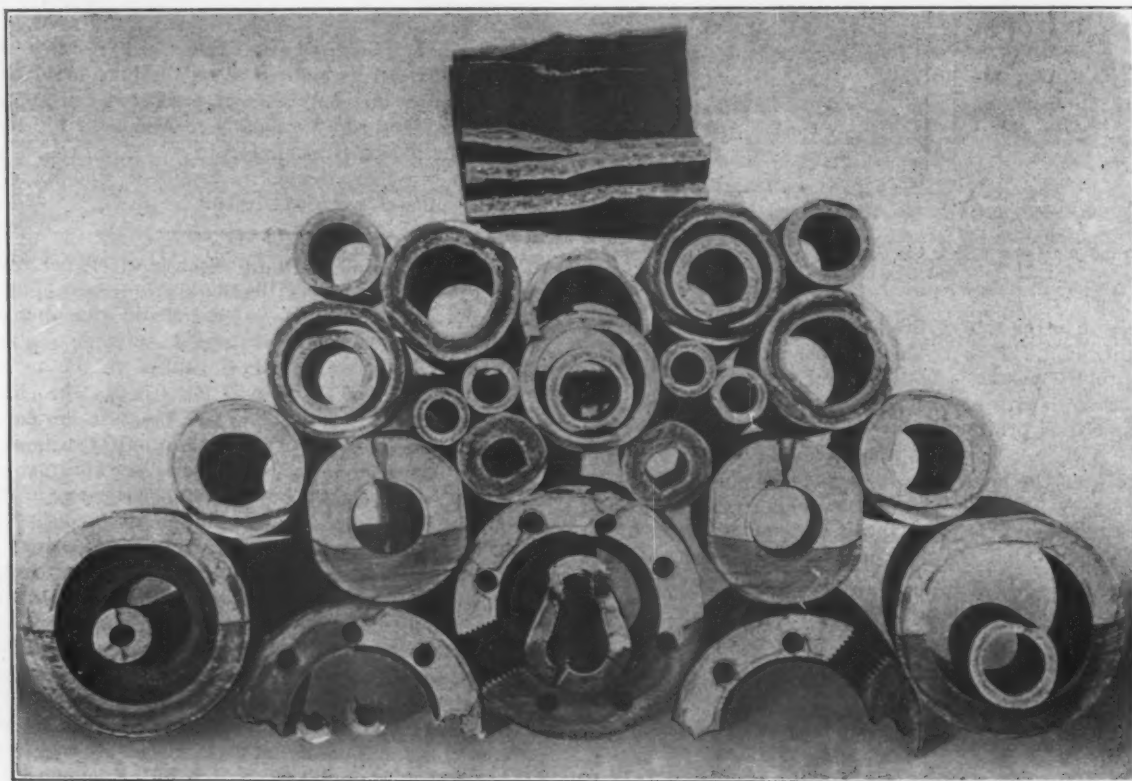


Fig. 1.—Sectioned Case-Hardened Articles Showing the Depth and Uniformity of Penetration Even Around Small Holes.

ing to a carbonizing temperature, but it seems to be pretty reliable. By packing the articles initially in a considerable amount of material to afford a prolonged supply of carbon, the depth desired may sometimes be obtained. This method is also expensive, largely because of the great weight of packing which has to be heated to and maintained at a high temperature for a very long time.

Even when care and expense have not been spared, the results are not uniform and certain. The conditions obtaining in an average packing case will explain this unreliability in part, at least. Active carbonization begins at about 1300 degrees F., and as this heat will not be reached in all parts simultaneously carbonization will proceed irregularly. This might be compensated by cooling in the same gradual manner as heating, if that was possible, but it is not with regard to that heating which immediately precedes the hardening plunge. Moreover, it would seem practically impossible to control materials and packing so that the chemical conditions are everywhere the same.

The uncertainty, difficulty and expense of the present

stronger and so avoid fracture. To case-harden such rollers to a sufficient depth and bring the center to a proper non-crystalline condition for exacting service would by the usual methods be quite an expensive operation. A great many parts could be made of tool steel to realize the advantages desired, but the cost of the raw material—from four to six times that of mild steel—and the difficulty and consequent expense of the machine operations are prohibitive in many cases. In fact, the cost of even mild-steel case-hardened parts is frequently prohibitive.

A process of case-hardening that reduces the cost, eliminates the uncertainty of results and approximates perfection in uniformity would be bound to succeed and improve machine manufacturing. Such an ideal process it is hoped the new method of carbonizing by gas may prove to be. It uses no packing, hence does away with packing and re-packing, which is ordinarily a large item of expense. The carbon is supplied by a current of carbon-laden gas, under pressure, which conduces to uniform treatment, and the penetration of remote parts and holes.

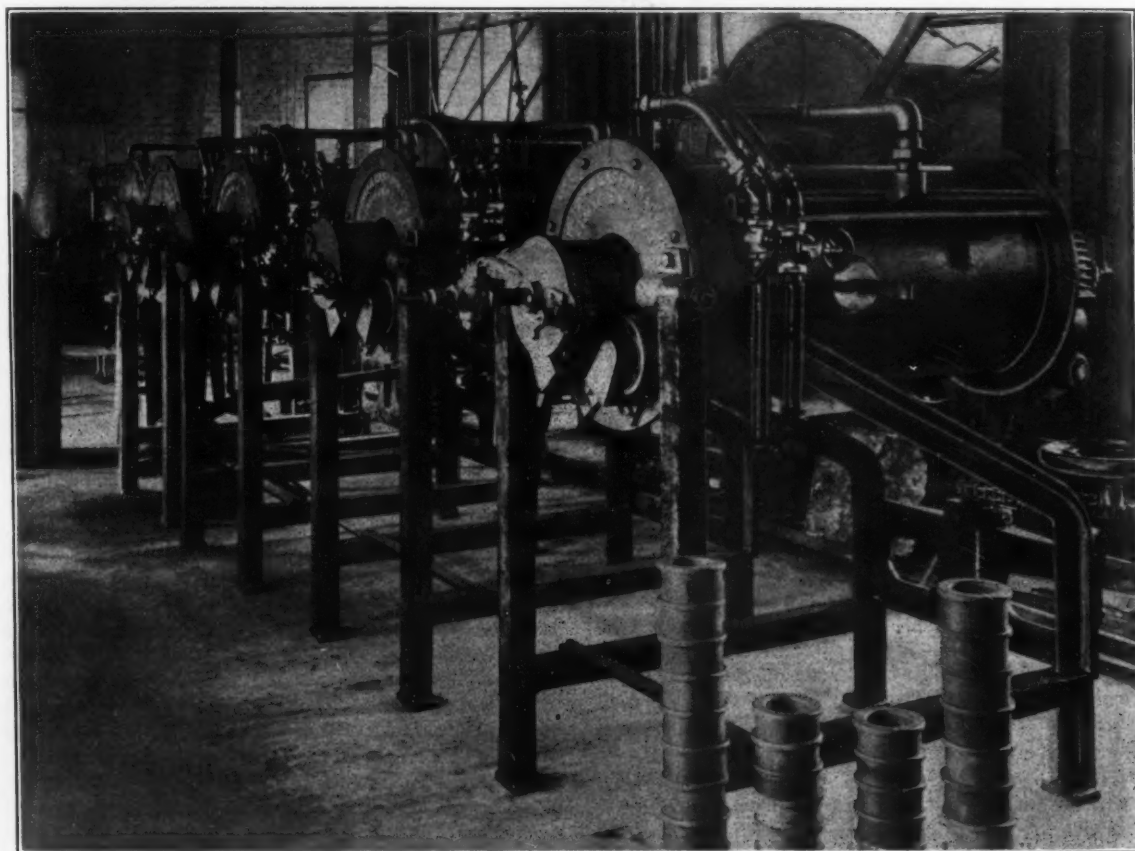


Fig. 3.—A Battery of the Carbonizing Furnaces Made by the American Gas Furnace Company, Elizabeth, N. J.

methods of case-hardening have thus seriously restricted its application. There are many parts about machines that could very advantageously be hardened on their exteriors. A tough interior combined with a glass-hard exterior is a valuable combination. A hard surface may be more permanently polished, is less liable to rust, offers less friction with contacting parts, and is less subject to wear, thus maintaining with greater persistence the precise dimensions of the piece. Also, a case-hardened part derives a rigidity from the skin of high-carbon steel that may be of great value. Shafts, and all moving and turning parts, may usually be treated with advantage by the case-hardening process. The hexagonal heads of screws, the slots of wood screws, nails, &c., would no doubt be welcomed in case-hardened form, if they could be produced commercially. In some cases it is merely the expense which makes case-hardening prohibitive. In others, it is the necessity to finish by grinding, on account of the distortions arising from the inequalities of contraction due to differences in degree of carbonization at various points. In rollers for roller-bearings, it is sometimes advantageous to have a high-carbon exterior combined with a tough core, to make the journals at each end

As the work is agitated while being carbonized, and the exhausted gas is conducted away while fresh gas is admitted, the supply of carbon is continuous and quite deep carbonization can be effected in a moderate time. Case-hardening by this process seems to eliminate guess-work and make possible anticipated results. A further advantage is the possibility of carbonizing under considerable pressures. Experimenting in this direction is as yet incomplete, but it holds the promise of accomplishing the desired results more rapidly. The end principally sought now is to eliminate the danger involved with gas under pressure in a red-hot, and consequently somewhat pliable container.

The evenness of penetration secured by the gas process may be observed in Fig. 1, which shows a variety of work. Attention is especially directed to the case-hardening of the small holes. Fig. 2 suggests something of the range and variety of work which may be performed. The long parts there shown are representative of a class of work on which case-hardening by the new process promises to be especially effective. If in the hardening more than the most insignificant deflections are produced the amount of after grinding necessary becomes a serious setback to

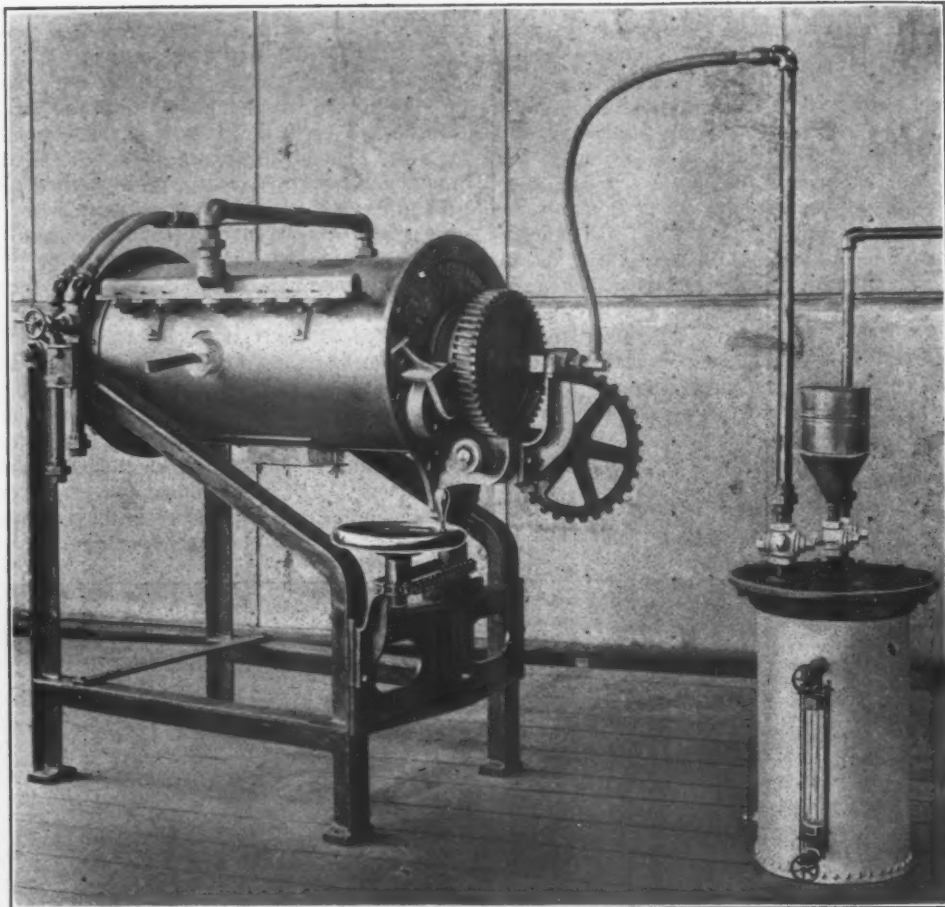


Fig. 4.—A Rear View of One of the Carbonizers and the Gas Producer.

economical manufacture. The uniformity of the new process, supplemented by a device for straightening such parts during the hardening, avoids this commercial difficulty.

The carbon laden gas is generated in a gas producer and conducted to the machine where it is admitted to a chamber containing the articles to be carbonized. This chamber is the central portion of a rotatable retort heated by a gas furnace. Before the gas is admitted, the work has been brought to the proper temperature, about 1500 degrees F. Rotating the retort rolls the articles about so that all parts are exposed to the action of the gas. The gas is allowed to pass off at the end of the retort opposite to that at which it was admitted. The carbonization is effected by one continuous process.

The work is readily introduced and withdrawn from the heating chamber, and may also be inspected to determine its temperature or condition. This latter feature is an advantage not found in the older processes. Articles hermetically sealed in an iron box and packed in bone-

dust or other material are effectually hidden from observation. Although the temperature may be observed by test wires or rods which have been inserted with the work and can be withdrawn, but in the new process the work itself can be observed.

Fig. 3 is a front view of a battery of carbonizing machines, and Fig. 4 rear view of a single one. In the latter the gas producer is seen to the right. The large horizontal cylinder is the gas furnace, and contains a smaller cylinder, which it heats and within which the carbonizing process is carried on. This smaller cylinder, which is the retort, projects from the furnace at both ends, and rests on four wheels as may be seen in Figs. 3 and 4. The longitudinal expansion of the retort is thus permitted without interfering with the rotatability. The pipe leading from the producer to the carbonizer seen in Fig. 4 conducts the gas to the retort. The sprocket wheel is the driver of the mechanism, and is mounted on the same shaft with a worm meshing the worm wheel on

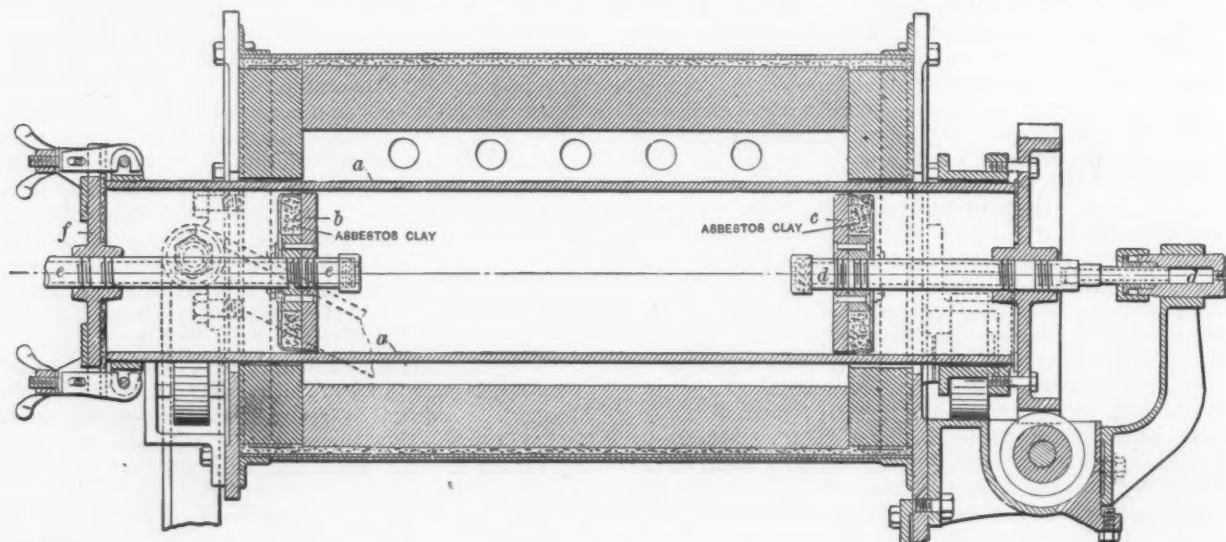


Fig. 5.—Longitudinal Sectional Elevation of the Furnace and Retort of the Carbonizer.

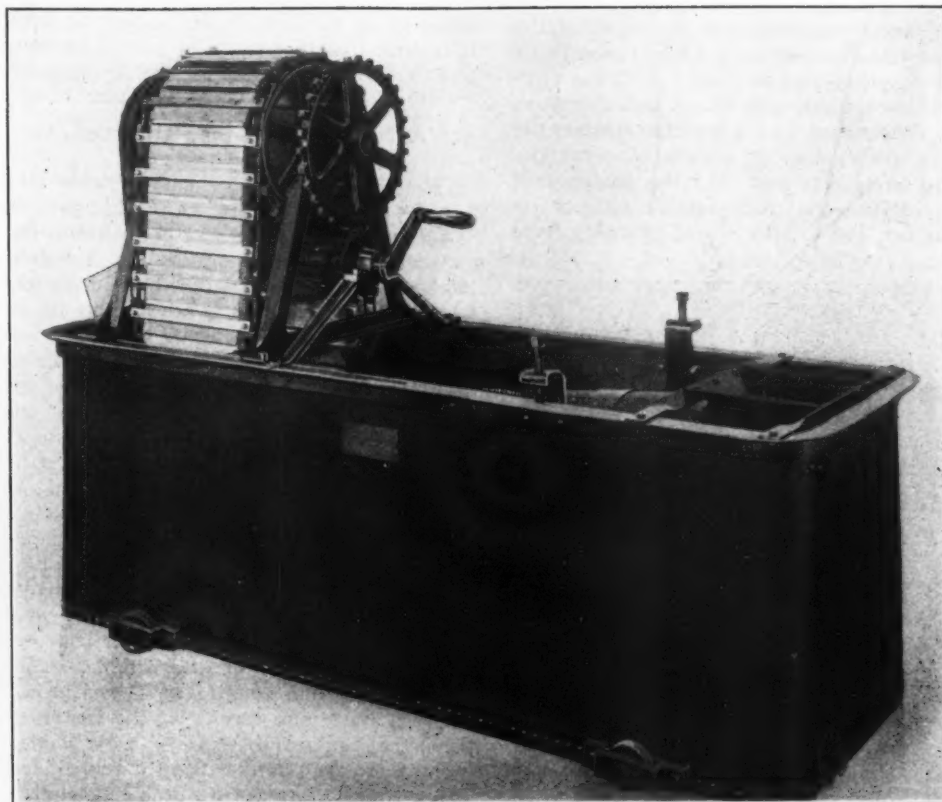


Fig. 6.—The Mechanically Operated Quenching Tank Made by the American Gas Furnace Company.

the retort to which it imparts a slow rotary movement. The pipes above the furnace in both illustrations have no connection with the carbonizing gas; one conducts air and the other fuel gas to the heating burners. The furnace is hinged at the forward end, permitting the retort to be tilted by operating the hand wheel. When the cap, seen in Fig. 3, has been removed, the contents of the retort may be discharged into a hardening bath or other receptacle.

By referring to Fig. 5, a clearer idea may be obtained of the operation and construction. The cylinder *a* is the retort, the part between the piston-like disks *b* and *c* being the carbonizing chamber. Here the work is placed upon suitable holders or loosely in the chamber according to its character. The carbonizing gas is admitted through the tube *d* and discharged through the tube *e*, which latter passes through the sealing cap *f*. The enveloping cylinder is the furnace and is lined with firebrick.

The carbonizing gas is a mixture of carbon vapor and a neutral gas. This carbon laden gaseous mixture is supposed to hold minute particles of carbon in suspension until they are absorbed by the red hot articles in the carbonizing chamber. The materials used to generate the gas are said to be obtainable in the open market.

Having been carbonized to the desired depth and degree the articles are allowed to cool. They are then replaced in the retort and brought to the proper temperature for hardening. While the temperature is still rising the cap (together with the attached disk) is removed, the furnace and retort raised and the contents discharged into a quenching bath. Much depends upon the quenching process. The object is to effect a sudden cooling of the carbonized portion. If the rate of reducing the temperature varies the result will vary. By the ordinary method of chilling small articles in bulk the heated pieces are placed in a basket or other open receptacle and dipped into the cooling bath. Obviously the conditions are not the same for all the articles. The temperature of the interior pieces is maintained, not only by their contained heat, but by that of the surrounding pieces, and the chilling liquid will be more or less heated when it reaches them. In consequence a different hardening is effected in different portions of the mass, giving rise to different degrees of hardness as between different pieces, and even as between different parts of the same piece. A machine manufactured by the American Gas Furnace Company meets the difficulties which ordinarily arise.

At the right-hand end of the apparatus shown in Fig. 6 is a hopper, into which the heated articles are dropped. The large tank contains the quenching liquid—water, oil or whatever it may be. In this tank is a long perforated drum rotatable on an approximately horizontal axis. As the heated articles pass from the hopper they drop into the interior of this drum and thus come into contact with the chilling liquid. The lower surface of the drum is inclined, hence the articles gravitate to the other end of the tank. The inclination of the drum may be altered to suit the work; flat pieces require a more pronounced inclination than spherical pieces to pass them along at a proper rate of speed. The articles are discharged from the drum into an endless chain of buckets, and are thereby raised and delivered from the tank at its extreme left-hand end. The whole may be operated by hand or power. The buckets are perforated, and their construction may be understood from Fig. 7.

The quenching liquid enters the tank near the bottom at the receiving end. As it becomes heated from contact with the work it rises to the surface and is conducted off through an overflow. In this way a fairly constant quenching temperature may be maintained. The rotation of the drum and the movement of the buckets tend to circulate the liquid, and so assist in maintaining equality of temperature. This device is useful also for other purposes than hardening, such as cleansing or chemically coloring various metals. It may be mounted on rollers, as is the one illustrated, to permit transporting from place to place in the shop.

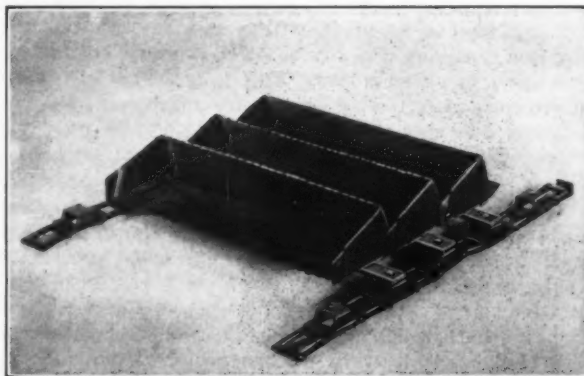


Fig. 7.—A Section of the Conveyor Used in the Quenching Tank.

Instead of replacing the articles in the retort of the carbonizer for the final heat—i. e., the one immediately preceding quenching—they may be placed within a heating machine, such as that shown in Fig. 8, and treated as before described. The use of such a machine releases the carbonizer for its special duty of carbon impregnation. However, it must be remembered that the tendency of the heater is to diffuse the carbonization already secured—that is to say, the articles would probably have

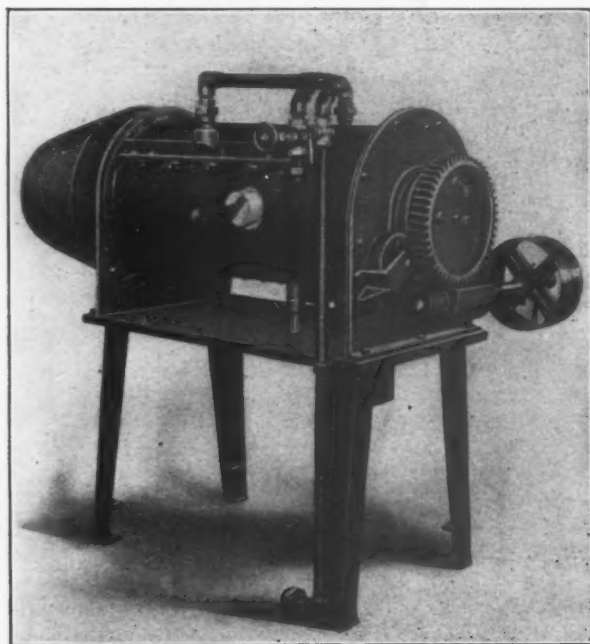


Fig. 8.—A Machine Which May Be Used in Place of the Carbonizer for the Reheating.

an increased depth of carbonization, but a decreased degree at the surface. If the carbonization already effected by the carbonizer is sufficient in degree to permit of this reduction at the surface, then the heater may be used to advantage. But if no slight drop in degree of surface carbonization is permissible, then the carbonizer should be used for the final heat as well.

It is scarcely to be doubted that the reliability, economy and general simplicity of the new process will mean much to the art of case hardening. It is even ventured that steel may be manufactured by this process, suitable shapes and sizes being converted into high carbon steels by impregnating them with carbon. Melting these carbonized pieces or working them thoroughly, the whole would be converted into a homogeneous mass.

The A. Garrison Foundry Company, Pittsburgh, has completed a large roller table, to be used in connection with the new 28-in. billet mill of the Pittsburgh Steel Company, Monessen, Pa. The table was built to specifications furnished by the Garrett-Cromwell Engineering Company, Cleveland, Ohio, and is 113 ft. 6 in. long, and 13 ft. wide, its total weight being 325,000 lb. It is of the latest type and is intended to be motor driven. The contract was placed about April 1 and stipulated that delivery was to be made within two months, but the Garrison Company was able to do even better, cutting the time down to seven weeks. This is a remarkably short time, considering the nature of this machinery, but the company has special equipment for this class of work, which enables it to make record time when necessary.

The Government engineers, reporting on the proposal for a breakwater outside the harbor at Gary, Ind., say that the harbor is designed to be a slip about 4000 ft. in length, under the control of the United States Steel Corporation. It is conceded that a breakwater is necessary, since the harbor will be exposed to the sweep of waves from Lake Michigan in all northerly winds, but the Board of Review considers that as but one company will be benefited by the breakwater, the question of its con-

struction by the Government should be left to Congress. It is estimated that it would cost \$1,140,000 to build the breakwater, and \$10,000 a year to maintain it.

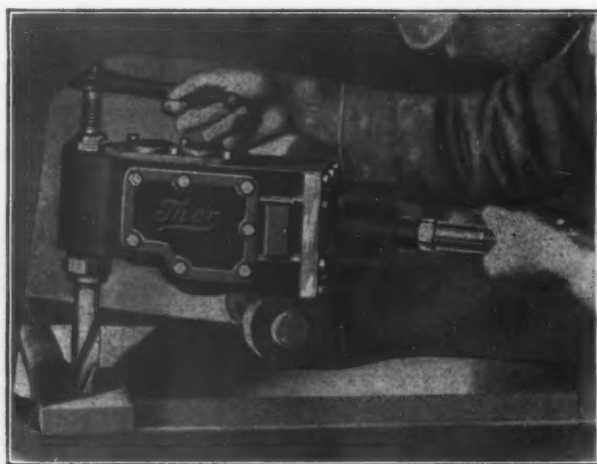
A New Thor Close Quarter Air Drill.

The No. 9 Thor close quarter piston air drill, which has just been brought out by the Independent Pneumatic Tool Company, Chicago, Ill., is similar to the No. 8 drill, but applicable to heavier work. Both drills, as the name implies, are intended for drilling in corners and places where there is limited clearance. The illustration shows the machine in use drilling tie brace bolt holes in a locomotive frame. In the new machine the distance from the throttle connection to the outside of the spindle case is 15 $\frac{1}{8}$ in.; the distance from the point of the feed screw to the end of the socket 8 $\frac{1}{8}$ in.; the radius from the feed screw to the outside of the case, 1 9-32 in.; the width of the case at the cylinder flanges, 5 3-16 in., and the width of the case at the spindle, 6 $\frac{1}{4}$ in. It weighs 31 lb., and runs at a speed of 122 rev. per min.

The spindle is at the extreme end of the tool and the air motor is at the opposite end. The motor consists of two cylinders parallel with each other, and perpendicular to the spindle. The center lines of both cylinders intersect the center line of the spindle. The pistons are double acting and operate on a two-throw crank shaft. Between the crank throws at the center are the eccentrics; the cranks and eccentrics are a single forging. The eccentric straps operate directly on balanced cylindrical piston valves, having a reciprocating motion. The air is taken in centrally between the cylinders, and the valves control the air as close to the cylinder bore as the material will permit.

Geared to this crank shaft is another two-throw crank shaft diametrically opposed. These cranks actuate two oscillating levers, concentric with the drill spindle and loosely mounted on it. These levers are provided with pawls of practically the whole thickness of the lever, which engage ratchet teeth cut in the spindle. Each lever operating crank makes its power stroke during the part of its revolution when it is farthest from the spindle. It therefore makes the speed of the lever more uniform, since it pulls forward considerably more than its half revolution and returns quickly to action in the remainder of the revolution, after the manner of a crank shaper. The cranks being opposed, the motion of the drill spindle is continuous and practically constant.

The cranks on the engine shaft are not the usual 90



Drilling a Locomotive Frame for a Tie Brace Bolt with a Thor Close Quarter Drill.

degrees apart, but are at an angle of 135 degrees, thus allowing two pistons to pull when the position of the levers requires the greatest power. This makes the drill in a degree self-regulating and tends to still further insure a uniform angular velocity of the drill spindle. This drill is provided with a reversible ratchet feed mechanism, operated within the width of the body of the drill itself. A poppet valve throttle controls the speed and power, and also acts as a handle.

The Shelby Iron Company.

The Shelby Iron Company has issued its report for the year ended March 31, 1908. The profit and loss account compares as follows:

	1908.	1907.	1906.
Profits for year.....	\$66,261	\$60,802	\$46,950
Expenses, depreciation, &c....	22,159	3,536	5,243
Net profits.....	\$44,102	\$57,266	\$41,707
Previous surplus.....	251,404	244,138	252,873
Total surplus.....	\$295,506	\$301,404	\$294,580
Dividends.....	50,000	50,000	50,442
Profit and loss surplus..	\$245,506	\$251,404	\$244,138

The total assets and liabilities, as of March 31, 1908, were \$1,350,565, against \$1,316,504 on March 31, 1907. The capital stock is \$1,000,000.

As far as ascertained, no bad debts were incurred in the sale of iron during the year. The available assets and current liabilities, as of March 31, 1908, were:

Available Assets.

Cash at Shelby.....	\$9,033
Bills and accounts receivable.....	36,752
Pig iron on yard.....	104,937
Merchandise in commissaries.....	12,253
Stocks and bonds, market value.....	61,200
Furnace stocks—iron ore, charcoal, &c.....	85,337
Live stock, wagons, &c.....	3,517
Repair material.....	12,896
Total.....	\$325,925

Current Liabilities.

Bills payable for timber and furnace improve- ments.....	\$27,950
Bills payable, loan account.....	3,000
Accounts payable.....	11,208
Payrolls and other liabilities.....	7,848
Amount due treasurer.....	8,790
	58,796

Net available assets.....\$267,129

President T. G. Bush, in his remarks to stockholders, says, in part:

"According to our practice, 25 cents per ton of iron made during the year was charged into the cost of iron for extraordinary or prospective repairs. The extraordinary repairs which were made during the year were charged against this account.

"The stock of iron, it will be observed, is unusually large, due to the dullness of the iron market for the last half of 1907; also to the fact that it was not practicable to shut down the furnace, even though so much stock had been accumulated, until a certain quantity of charcoal, &c., on hand or in transit, could be utilized."

To the *Wall Street Journal* President Bush says:

"In connection with this report I desire to call attention to the fact that practically only about three months of the fiscal year had elapsed before the market began to decline, and buyers began holding up their orders; so even at best the results were obtained from six months of the fiscal year of the country. There has practically been no market for iron since about November 1, 1907. I am pleased to report, however, that the outlook is very encouraging. Indications now are that iron of all kinds has about reached the bottom price, and with prospects of good crops, and the question soon to be settled as to who shall be the next President, we can hope for full restoration of confidence and an active and satisfactory business."

The Phillemac Rolling Mill Company.—J. P. McCaslin, superintendent of the Wheatland Mills, Wheatland, Pa.; Myron Phillips, superintendent of a bar mill at Youngstown, Ohio, and Alexander Lamont of Sharon, Pa., a practical mill man, for years a head roller in large mills, have organized the Phillemac Rolling Mill Company and have bought the property of the Brackett Bridge Company at Glendale, a suburb of Cincinnati, Ohio, on the main line of the Cincinnati, Hamilton & Dayton Railroad. The directory of the company will include seven men. Nelson B. Cramer, the Cincinnati attorney who has been prominent through the negotiations, will likely be a member of the board. The plant of the Brackett Bridge Company is regarded by the purchasers as ad-

mirably adapted to their purpose of manufacturing bar iron. There will have to be few alterations in the buildings. The main building is 83 x 160 ft., with an attachment on either side, one being 24 x 150 ft., and the other 40 x 100 ft. The plant has a fine office structure with fireproof vaults, &c. Of the necessary machinery and appliances, a train of rolls for a 10-in. mill has been ordered for a 60-day delivery and negotiations are progressing for some gas engines. As soon as practicable after the beginning of operations, which will be in the late summer or early fall, an 8-in. mill will be started and other sizes thereafter.

The Amalgamated Scales of Wages.

The thirty-third annual convention of the Amalgamated Association of Iron, Steel and Tin Workers, recently in session, at Youngstown, Ohio, adjourned May 19. All existing scales for puddling, sheet and tin mills were reaffirmed, with the exception that in the tin plate scale foot-note No. 11, which formerly read "roll hands on sheet and jobbing mills shall be paid one day's work at laborers' wages for changing rolls," was changed to read:

All tin and black plate shall be weighed by the company after being sheared and opened, and stickers are to be opened by the company.

Foot-note No. 24, which formerly read "roughers running over iron to receive 10 cents per day; 15 pair double iron to constitute a heat," was changed to read:

That 25 per cent. shall be paid to shearman on all orders that are cut once on one shears, and then taken to another shears to be finished. When there is more than one size in one pack, causing shearman to throw one cut or piece on the floor, that the company furnish a man to pick them up and place them on the bench for shearman.

In the memorandum of agreement, preceding the boiling and finishing scales, clause five formerly read as follows:

All mills will be allowed to work three turns when practicable. On all mills working three turns, eight hours shall constitute a day's work. Rolling shall not start earlier than 5 o'clock Monday morning, except by local agreement between men and management in mills not equipped with traveling cranes for changing rolls; and in the event of traveling crane installation during scale year, prevailing practice at that time to be continued; and the week's work shall finish after the first eight-hour shift on Saturday. On all mills working three turns a third roller should be employed.

This was changed to read as below:

All mills will be allowed to work three turns when practicable. On all mills working three turns, eight hours shall constitute a day's work. Rolling shall not start earlier than 5 o'clock Monday morning, and the week's work shall finish after the first eight-hour shift on Saturday. On all mills working three turns a third roller should be employed.

These were the only changes recommended. Arrangements have been made to hold a wage conference with the Western Bar Iron Association, composed of some of the Western bar iron mills, at Cambridge Springs, Pa. on Tuesday, June 2. After this conference is over, a meeting will be held between the Amalgamated Association and the Republic Iron & Steel Company at Pittsburgh.

The E. Killing's Molding Machine Works, Ewald Killing, proprietor, Davenport, Iowa, has under construction a new foundry, 50 x 150 ft., which is expected to be ready for occupancy about July 1. It is stated that the equipment will be supplied from the present foundry, and will include several Killing molding machines.

The Falk Company, Milwaukee, Wis., has a contract for the steel castings for 75 new locomotives for the Chicago, Milwaukee & St. Paul Railroad now being built at Milwaukee for use on its Pacific Coast extension.

The second annual convention of the International Master Boiler Makers' Association, of which George Wagstaff, supervisor of boilers on New York Central Lines, is president, held its opening session on Tuesday at the Hotel Pontchartrain, Detroit, and will continue to Friday.

The New Morris Geared-Head Lathe.

When using a high speed steel tool to its fullest capacity in turning a 6-in. shaft it is generally necessary to employ a lathe of about 24-in. swing to furnish sufficient pulling power. The new geared-head engine lathe illustrated in Fig. 1 is designed to have ample power for all diameters within its swing and yet be a general purpose machine. It was designed by W. L. Shellenbach of the J. B. Morris Foundry Company, Cincinnati, Ohio, and is built by that company.

To show in a single specimen of work something of the lathe's range of application, the object shown in Fig. 2 was turned. It is of gray iron in three parts. The flange or base is $1\frac{1}{2}$ in. diameter by $1\frac{1}{2}$ in. thick, and the cut on its periphery was taken at 50 ft. per minute, using 1-16 in. feed, 11-32 in. deep. Three scrolls are chased on its upper face, the outer one a left-hand scroll of six per inch, the middle one a right-hand scroll of three per inch and the inner a left hand of four per inch.

driving direct with the belt speeds, and that the machine must not be slowed down or stopped while making speed changes, the bottom of the pedestal, shown in Fig. 1, was faced at 1-16 in. feed, and the speed was changed eight times during the cutting with the drive at all times through gearing. The tool marks show but there is no unevenness caused by the gear teeth or changing speeds.

Among the novel features of the lathe are the following: A driving pulley mounted on the spindle which can be locked to it like the ordinary cone pulley when driving with open belt; headstock provided with 16 changes of speed, to which either a direct or alternating current motor may be connected without changing the design or supplying a different headstock; an index within the headstock which shows the exact diameters that can be turned at various cutting speeds, ranging from 20 to 60 ft. per minute, hence the operator need not know the spindle revolutions per minute, but deals entirely with the diam-

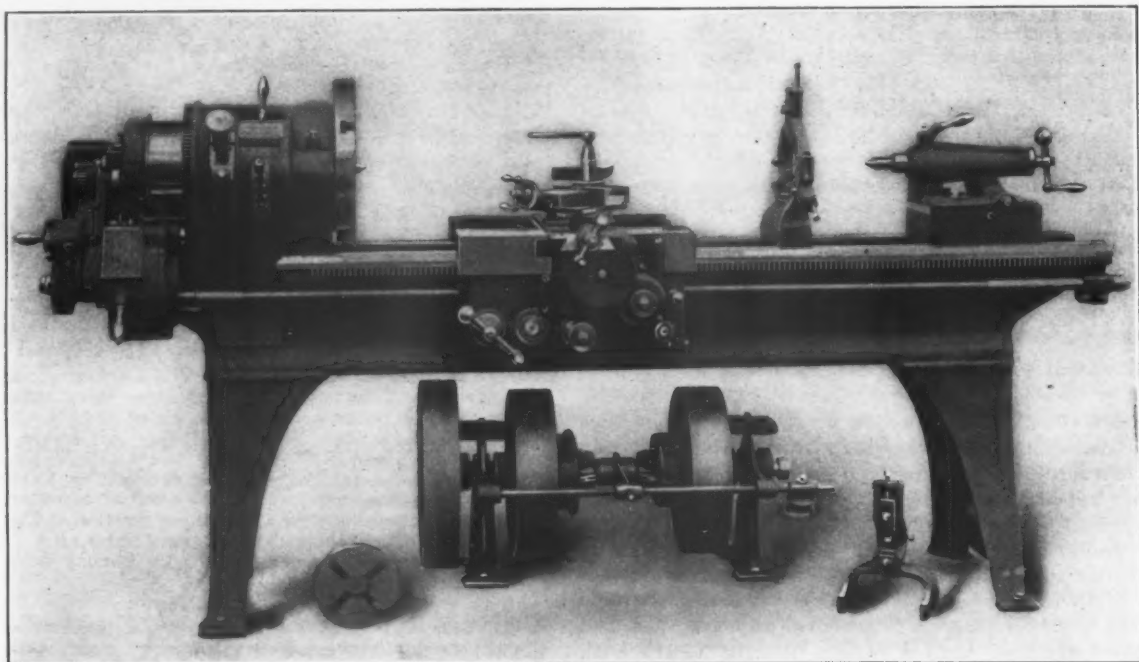


Fig. 1.—The New Geared-Head Lathe Designed by W. L. Shellenbach and Built by the John B. Morris Foundry Company, Cincinnati, Ohio.

Where the column joins the flange, a 4-in. taper per foot, is turned, next above it the same taper reversed, and above this a $\frac{1}{2}$ -in. taper per foot. On top of the latter is a square thread of two per inch pitch, A, more clearly shown in Fig. 3. The square threads were rough chased with the rack feed, after which the half-nut was thrown in and the threads finished part of the way down with the lead screw. This gives an idea of the use of the rack feed in rough chasing to save the lead screw. A left-hand United States standard thread three per inch is chased directly above the square thread. Over this are Acme threads of four and five per inch, and at the top of this section a right-hand Whitworth thread of six per inch pitch. A hole in the pedestal is chased with a left-hand United States standard thread of 2-in. taper per foot to receive the steel bar at B. This contains 19 threads, ranging from 7 to 32 per inch. The top of this bar is bored for a No. 3 Morse taper, and at C has a second steel stem fitted into it, which contains 15 threads from 36 to 112 per inch. A knurled nut, D, chased with 112 V-threads per inch fits the extreme top of this stem, where the latter is $\frac{1}{2}$ in. diameter. Surmounting all is a tool steel screw E 9-32 in. long, 0.105 in. diameter at the body of the thread and 0.175 in. diameter of head. This screw is chased 32 threads per inch, and of special form of thread to screw into the spring of a Brown & Sharpe test indicator.

To controvert the contention that smooth cuts cannot be taken while driving through gearing, but only while

eters of the work in hand, and sets the index for the cutting speeds desired.

The quick change mechanism covers a range of threads from 2 to 112 per inch, and is self-contained within a single housing secured to the bed. The carriage feeds are in the same ratio and in the same direction as the screw feeds. The cross feed screw is also in the same ratio as the lead screw, and the index for longitudinal threads also applies to the cross feed screw for chasing scrolls. A taper attachment is used which permits turning tapers up to 4 in. to the foot. It is attached directly to the face of the apron, and can be later applied to a machine not ordered with it. All adjusting screws on the machine and countershaft can be operated by the toolpost wrench.

In the sectional plan of the headstock, given in Fig. 5, the driving pulley is shown at *a* mounted upon and keyed to a steel sleeve pinion, which is bronze bushed and revolves loosely upon the spindle. The sleeve carries a cone of gears, *b*, splined to slide upon it and provided with clutch teeth. The clutch *c* is keyed to a bronze sleeve, which also revolves loosely upon the spindle. The gear *d* is splined to slide upon the clutch sleeve, and corresponds to the cone pinion of the ordinary lathe. Gear, *d*, meshes with gear, *d*₁, splined to the pinion *d*₂, located in the bearing on the front of the headstock. The sliding pinion *d*₂ meshes with a steel face gear, *d*₃, which is counter bored and threaded to receive the face plate *e*. The face gear is attached to the flange of the spindle by dowel

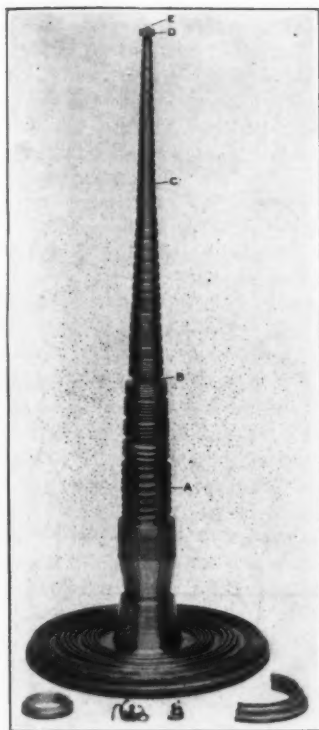


Fig. 2.—An Exhibition Piece of the Lathe's Work.

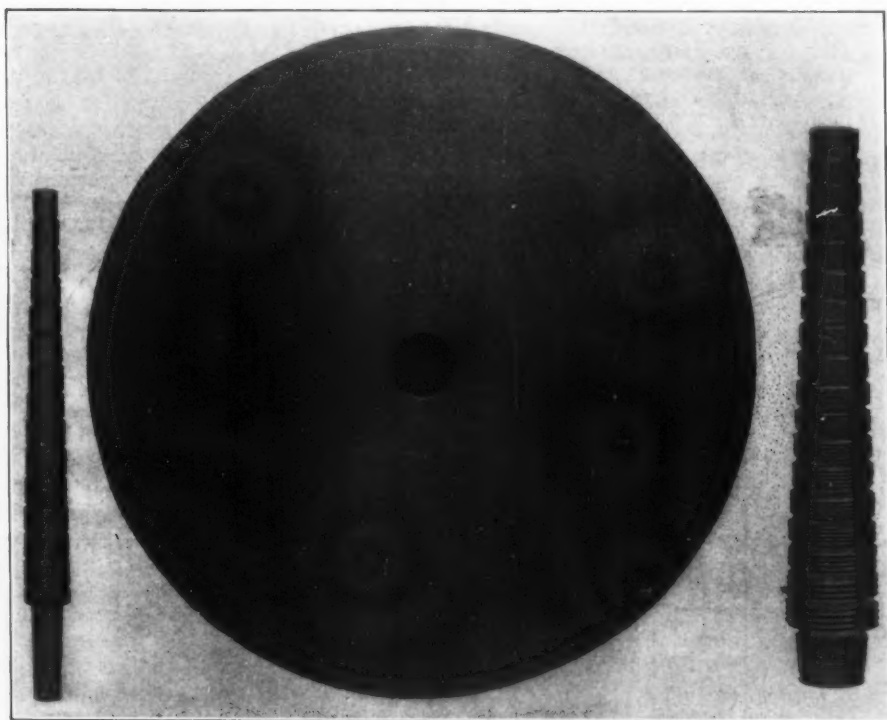


Fig. 4.—The Bottom of the Base of the Pedestal and the Two Screw Threaded Spindles.

pins and screws. The web of the face gear extends down back of the spindle flange, and when the face plate is screwed into the face gear this gear and the spindle clamp tightly. The extended nose of the spindle fits the bore of the face plate for centering it, and the threads within the face gear fit loosely so that the truth of the face plate will not be affected by inaccuracy in the thread. The pinion d_2 being on the front of the head, the driving effort is downward and on the same side of the center as the tool. Because of this construction the overhang of the chuck and the face plate is reduced. The threads within the face gear d_3 are about the same diameter as the counterbore in the back of the ordinary chuck for a machine of this swing, and in fitting a face plate for a chuck it is only necessary to bore out a blank plate to fit the nose of the spindle and chase a thread on this plate,

leaving a portion to be fitted into the chuck. This method of driving the chuck and face plates eliminates torsional stresses within the spindle when driving on all diameters, employing a high gear ratio as the gear d_3 is practically a part of the chuck.

The clutch teeth f , formed upon the spindle, engage corresponding teeth or key-ways within the sliding gear d . When this gear is moved to the extreme left, it is locked to the spindle, but this movement cannot take place until the gear d_2 is disengaged from the face gear d_3 . When the clutch c is engaged with the clutch teeth on the gear cone b , and the gear d is clutched to the spindle, the latter is driven direct at its maximum speed. By disengaging the gear d from the spindle and engaging the gear d_2 to the face gear d_3 , the slowest drive is obtained. By manipulating the gear d and the pinion d_2 the high and low gears are available. Gear d has an internal gear secured to it, meshed by the tool steel pinion stem g . This revolves in a bronze bushing and carries the gear g_1 at its left end. The telescopic gear g_2 is provided to be mounted over the gear g_1 to impart motion to the pinion stem at a different speed. The pinion stem is contained within a rotatable housing mounted in the casing, which forms the front of the headstock. The housing can be rotated by the extension g_3 , shown in the sectional elevation of the headstock. The telescopic gear g_2 may be engaged with any one of the cone gears b or the sleeve pinion, or it may be removed and the gear g_1 engaged with any one of the cone except the sleeve pinion. The gear g_2 can therefore be driven at four speeds, and the gear g_1 at three, and when the clutch teeth on the gear cone b are engaged with the clutch c , and both of the gears, g_1 and g_2 are disengaged, another speed is obtained, making eight in all. These speeds are doubled by using the high or low gear, as before mentioned.

The housing of the pinion stem g is cut out, as shown at h in the sectional elevation of the headstock to permit the clutch c to be engaged, and when such is the case the housing cannot be moved sufficiently to engage the gears g_1 and g_2 with the cone of gears b . Obviously the gear d must not be engaged to the spindle when the pinion d_2 is engaged to the face gear d_3 . To prevent this, as shown in the plan section of the headstock, the sliding pinion d_2 is journaled at its left end in a bronze bushing, which has rack teeth milled in it to engage the pinion stem d_4 , shown in the sectional elevation of the headstock. This pinion stem has its bearing in a steel sleeve which fits into

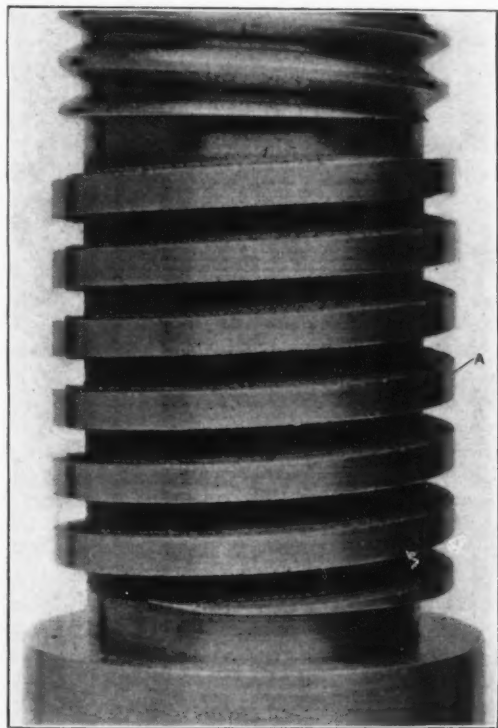


Fig. 3.—A Detail of the Square Thread A of Fig. 2, Showing the Rough and Partly Finished Cuts.

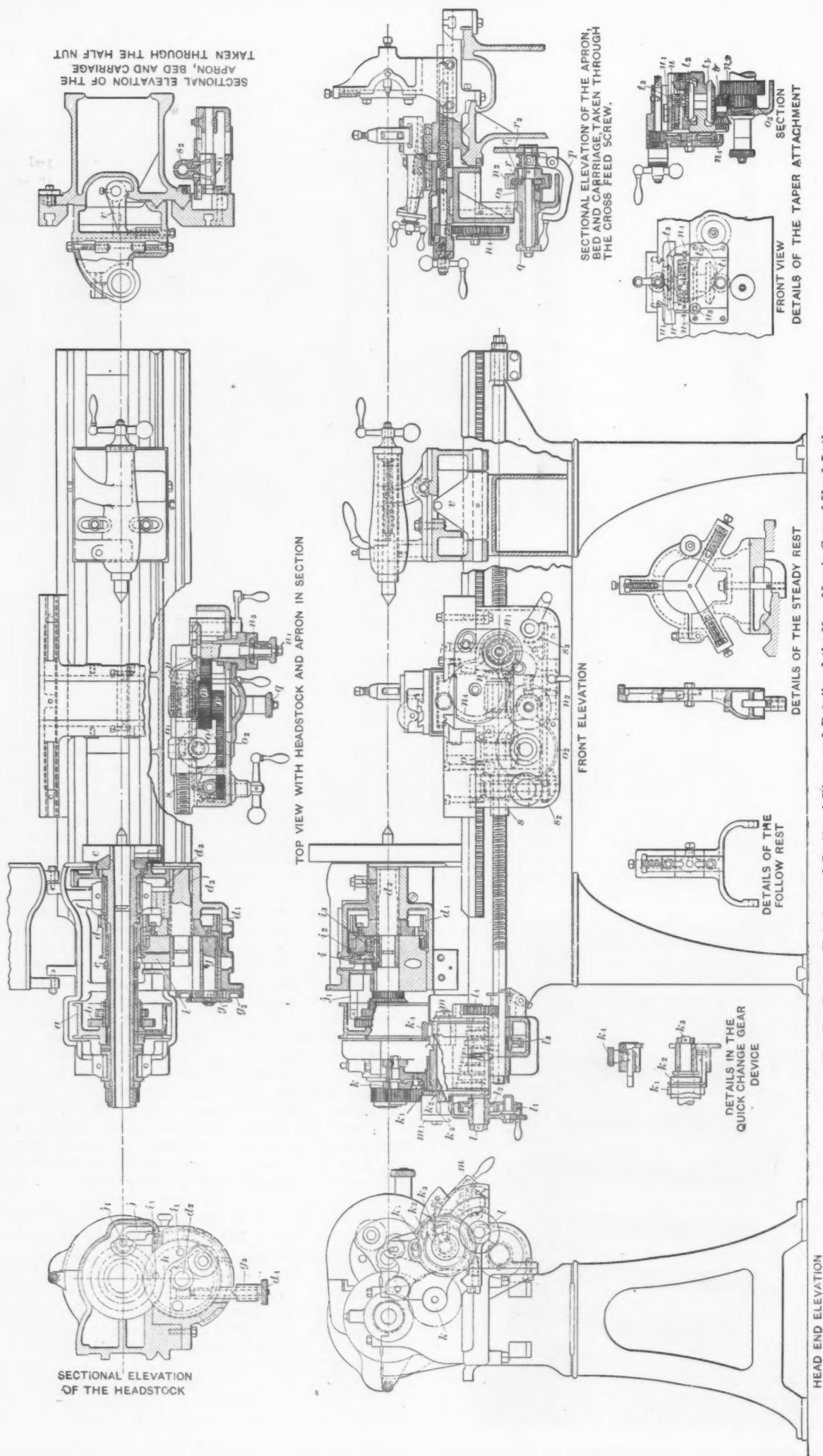


Fig. 5.—Various Exterior and Sectional Views and Details of the New Morris Geared-Head Lathe.

the rotating housing previously referred to. The sliding detent collar g , is mounted over the sleeve and is operated upon it by the knurl which is secured to the pinion stem d . The pinion stem is spring seated, to hold the detent collar into the notches milled in the face of the casing. The knurl may be turned in either direction to slide the driving pinion d , and may be moved radially to adjust the housing. The housing has a sliding sector i mounted upon and around the pins t , which is grooved to receive the flange of the sliding pinion d on the spindle sleeve. The longitudinal movement of the sector transmits movement to this pinion regardless of the position of the housing, and is accomplished by moving the bronze bushing at the end of the pinion stem d , which is provided with a specially formed key serving as a dog or tappet. When this key, as shown in the front sectional elevation, is moved to the left, the tappet on it strikes the sector and moves it enough to engage the clutch of the pinion d to the spindle, and at this instant a spring seated latch i , contained in the sector i , engages the extension on the key. At this position the machine is operated in the high gear, the pinion d being out of engagement with the face gear. To engage the low gear, the knurl on d , is turned to the right, and the sleeve attached to d , moving to the right, moves the sector i through the latch t , until the pinion d upon the spindle is disengaged from its clutch. At this point the sector i , carrying the latch t , is moved sufficiently to engage the counter-sink of this latch with the screw t . This engagement raises the latch t and allows the key and sleeve on d to move past, and, doing so, the pinion d is engaged to the face gear d .

Fig. 6 shows an index arrangement which is mounted on the front of the headstock, and has a pointer j secured to the rod j , which operates the longitudinal movement of the cone gears b upon the spindle pulley a . The position of the pointer is determined by notches milled in the bracket of the casing. An opening in the front of the casing exposes the index plate referred to before. The horizontal columns of the index plate give a list of the diameters to be turned at cutting speeds from 20 to 60 ft. per min., and the vertical columns correspond with those of the plate J , which designate the position of the pointer J . The opening is only large enough to expose the figures under the heading of diameters of work at a given speed feet per minute, but the index may be adjusted by the knurl J , to expose any one of the columns showing the cutting in feet per minute.

Openings are cored in the bed and permit a belt or silent chain drive from a motor mounted underneath the headstock, these openings being in line with the pulley on the spindle. The headstock is provided with a cover. When it is desired to mount the motor above the headstock, a platform is substituted to receive the motor in place of this cover. On account of the number of gear changes within the head, it is not necessary to use a variable speed motor, as the increment of mechanical speed change does not exceed 28 per cent. These features make the machine very desirable for using induction motor drive.

The front and end elevations in Fig. 5 show the new quick change device, the housing of which has a bearing for supporting the reverse plate k . This plate carries the transmitter or intermediate gears for giving the forward and backward motion to the feed; a shield covers these gears. The reversing is accomplished by a small eccentric and knurl which is contained in an extension of the housing. Power is transmitted from the spindle gear through the transmitters to the telescopic gear k_1 , the face of which is one-half that of the transmitters. This telescopic gear has its bearing in the housing concentric with the pivotal point of the reverse plate k , and is splined to slide upon the telescopic gear k_2 , while the latter is splined to slide upon the gear k_3 . These three gears are the driving members of the quick change. The gear k_3 extends beyond the face of the telescopic gears k_1 and k_2 , an amount equal to the width of the change gears and has no endwise movement, but is confined longitudinally within the bearing of the housing by a collar. The telescopic gears are moved longitudinally by an eccentric in the knurl, k_4 , to bring them in alignment with the change gears or flush with the gear k_3 .

A second shaft l has its bearing in the housing and carries a quadrant which carries what is ordinarily the intermediate gear, l_1 , of the plain change gear lathe. This gear is mounted on a bronze sleeve and has its bearing on a stud. Gear l_1 meshes with the gear l_2 , which is keyed to the second shaft l . The latter has a pinion milled in it, meshing with the gear l_3 , which is keyed to a clutch loosely journaled upon the lead screw bearing within this housing. The shaft l also has gear l_4 keyed to its right end, which meshes with the sliding gear splined to slide upon the lead screw. The clutch, previously referred to, receives the teeth of the clutch formed upon the sliding gear, which may be drawn out of mesh with those of gear l_4 , and the lead screw locked to revolve with the gear l_4 . This makes an 8 to 1 reduction to the index.

An opening is provided in the housing to receive the eight steel change gears, each of which has a three-tooth clutch at its hub. These gears are covered by a swinging plate m , tapped left hand to receive a screw which extends through the clamp m_1 ; when the plate is brought up exposing the change gears, the clamp is released, and when brought down to cover them, the clamp is tightened. This clamp receives the blank sector of the quadrant on the shaft l , and is used to lock this quadrant. The gear l_1 revolves on a stud and is mounted on a bronze sleeve, the outside diameter of which fits the bore of the change gears. The gear l_1 has clutch teeth to mate those of the change gears, so that any one of them may be secured to it. To make a change of feed, the plate m is raised and the quadrant thrown down in the position shown in Fig. 5. The change gear is now clutched to the gear l_1 , and the quadrant brought up until the gear meshes with one of the three gears, k_1 , k_2 or k_3 . These three gears and the eight change gears provide for cutting all threads from 2 to 14 per inch when the lead screw is driven through the gears l_4 , and the sliding gear and the same combination of gears will cut threads from 16 to 112 when driven from the pinion on the shaft l to the gear l_4 of the lead screw.

Fig. 5 also shows a plan view of the carriage, with part of the apron in section, and a front elevation of the apron is shown directly beneath. The right end sectional view of the apron, bed and carriage is taken through the center of the half nut. Directly beneath this is a sectional side view of the apron, bed and carriage taken through the center of the cross feed screws. The peculiar design of the bed is shown in these cross sections. The top of the shears is a solid plate extending to within $\frac{3}{4}$ in. of the spindle center and the carriage rests on and is guided by a large single V formed upon the plate. A smaller V is provided for the head and tail stock and an extra track planed at an angle forms a bearing for the bridge of the carriage close to the center of the downward line of strain. The carriage bridge has a taper gib resting upon this and adjusting screws to compensate for wear. Heretofore the carriage bridge has been allowed to bear directly on the tailstock bearing on the front side as a support, but this is open to the objection that wear at this point will finally lower the tailstock until its center will not align with the head and it does not form as close a support to the line of strain. The back part of the shear is planed flat to receive the tailstock and the back wings of the carriage, both of which slide upon but a single V.

The lead screw is splined to receive the bevel pinion n , which meshes with a bevel gear secured to the pinion stem n_1 . The latter transmits motion through an intermediate gear to the longitudinal friction gear n_2 , and extends out through the bearing on the apron to receive a knurl and friction. The friction mates the friction gear n_3 , which transmits motion to the cross feed screw through the intermediate gear n_4 , meshing with the cross feed screw pinion. The intermediate gear n_4 is mounted on a cover which is removable for reasons explained later.

By referring to the sectional elevation through the cross feed screw, it will be seen that the top slide of the compound rest is fed by an inclined screw; this is to give increased traverse to this part without making it extremely long and also to elevate the compound rest handle to prevent any interference with the cross feed handle. A rack is secured to the swivel of the compound

rest, which meshes with the inclined screw shown. The cross feed screw is provided with a spring seated plunger in the center of the ball crank which operates a friction for locking and releasing the graduated collar of the cross feed screw. By comparing with the front elevation it will be seen that the rack is secured to the bed with the teeth facing outwardly instead of down as usually. This is to enable placing the rack pinion *o* vertically. This pinion has a solid stem on either side and the top end of it fits directly into the carriage, and is provided with an adjustable dial which is let into the counterbore in the top of the carriage and is graduated to read to sixty-fourths of an inch. The rack is $\frac{1}{2}$ in. circular pitch and is accurately spaced so that a correct longitudinal reading may be had from the dial. The dial has a friction locking device similar to that of the cross feed screw and may always be set at zero. The lower end of the rack pinion *o*, as shown in the plan and front elevation, has its bearing in the back plate of the apron and has a bevel gear keyed to it, which meshes a bevel pinion keyed to the shaft *o*₁. This shaft is keyed to the hub of the spur gear *o*₂, which has its bearing in the apron. The pinion of the apron ball crank stem meshes the gear *o*₂; one revolution of the ball crank travels the carriage 1 in.

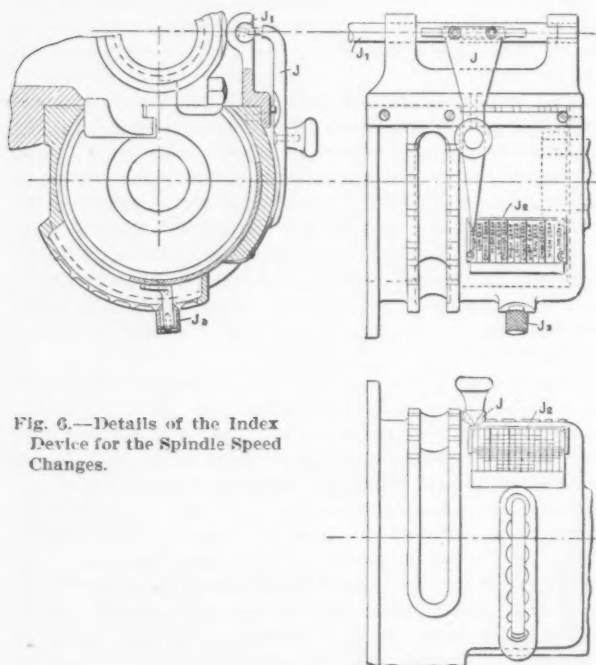


Fig. 6.—Details of the Index Device for the Spindle Speed Changes.

The gear *o*₂ also meshes the pinion *o*₁, from which it receives is power for feeding.

In the sectional elevation through the cross feed screw a section of the longitudinal friction is seen, and the positive chasing device for chasing through the rack feed, which is operated by the lever *p*. The pinion *o*₁, which transmits motion to the rack pinion, has a friction mounted upon it engaging the friction of the gear *n*₂. It may be locked and released by the regular longitudinal knurl *q*. Mounted within the friction gear *o*₁ is a hardened steel index ring, *r*. The gear *n*₂ has a key seat to receive the sliding tool steel key *r*₁, which is operated by a sliding collar, *r*₂, and is controlled by a shoe in the crank portion of the lever *p*. The divisions in the index ring correspond to the pitch of the lead screw, which in this particular machine has four threads per inch, hence the half nuts may be engaged at every quarter inch. Therefore the divisions of the index ring are such that a quarter inch movement of the carriage will allow the key *r*₁ to enter the slot of the index ring and lock the feed positively. This forms a positive drive through the rack pinion and not through the friction, and, while very accurate chasing cannot be accomplished, threads may be roughed to within a few thousandths of size without wearing the screw and then the half nuts engaged for giving an accurate finish. The half nuts *s* are mounted to slide within the apron at its left end, and the nuts are placed in this position so that the carriage may be moved to its farthest limit at the

tailstock end of the bed without the nuts interfering with the lead screw bearing at this point.

In the sectional view which shows the half nuts is shown the cam *s*₁, which opens and closes them. This cam is mounted on a shaft having a sector, *s*₂, keyed to it, which engages a rack extending along the inside of the apron and also engaging the sector *s*₃, mounted on the stem of the half nut crank. Since the regular rack feeds are in the same ratio as the screw feeds and same direction, even though the rack and screw feeds be simultaneously engaged, nothing serious will occur. The apron has a dummy plate casting secured to it by screws, which is always supplied when the lathe is furnished without the taper attachment to fill out the space that would be occupied by the taper attachment.

Fig. 5 also shows details of the taper attachment, including front and sectional views. The carriage has a slide fitted to it which contains the bearings of the cross feed screw. The slide is arranged to be moved across the carriage by a sliding shoe, *u*₁, mounted on the slide *u* of the swivel block *u*₂ of the taper attachment. When this attachment is not in use dowel screws are tightened which lock the slide to the carriage. The sliding spur gear meshes the friction gear *o*₂ of the apron and has clutch teeth to engage mating teeth of a bevel pinion, which meshes with the bevel gear *t*₁, and this gear is keyed to the stem of the bevel gear *t*₂. The latter meshes with a bevel pinion which is keyed to the worm *t*₃. This worm engages the threads of the sliding block *u*₁, which has a pin formed upon it to receive the sliding block *u*₁. The sliding block *u* is dovetailed into the swivel *u*₂ which may be set at any position and locked by the screw *u*₃. The swivel *u*₂ is calibrated in degrees from zero to 90 degrees, and is also stamped "tapers larger toward headstock." The other side of the circle is stamped "tapers smaller toward headstock," and is also graduated from zero to 90 degrees. The clutch of the spur gear *t* is engaged with that of the adjacent bevel gear by a pull pin, which cannot be pulled out unless the cover of gear, *n*₄ is removed. As the cross feed is never needed while the taper attachment is in use, the removing this cover throws out the automatic feed of the screw. The removable cover when in place bears against the pull pin holding the clutch gear *t* out of engagement, which will run loosely upon its hollow stud. The rate of feed of the sliding block is one-sixth that of the longitudinal feed of the carriage, and its maximum traverse within the swivel *u*₂ is 4 in. When the swivel *u*₂ is set, as indicated in the sectional detail, the block containing the cross feed screw will move 4 in. while the carriage is moving 24 in. Therefore, a taper 24 in. long can be turned at one setting and of any degree up to 4 in. taper per foot.

The shoe *u*₁ engages a groove planed across the tool post slide and has a gib for taking up wear. If the swivel *u*₂ of the taper attachment is set at zero the dovetailed slot of this swivel which carries the block *u* will be parallel to the groove of the tool post slide, in which the block *u*₁ travels, and the amount of taper will be zero, as the two blocks will be traveling in parallel guides, but if the swivel is set at any division other than zero, it will transmit movement to the tool post slide. A table is furnished with each attachment which gives the tapers in inches per foot from 1-16 to 4 in., and the corresponding included angle. It also gives the setting angle of the taper attachment swivel *u*₂ in degrees. The power is transmitted to the taper attachment and longitudinal feed through about the same number of gears, so that the back lash of these parts is less than with the ordinary device.

Fig. 5 shows also the tailstock and the method of clamping it to the bed. The clamp *v* is mounted on a rod, which has its bearings within the lugs of the base of the tailstock. A tool steel screw bears against the tool steel block at the top of the clamp, and these parts are hardened to decrease wear. The tool post wrench fits the adjusting screw, and very slight pressure will cause the clamp to bear tightly under the shear of the lathe bed. The top of the tailstock can be adjusted independently of the clamping of the base to the bed.

The follow rest is shown in a detail in Fig. 5. It straddles the bridge of the carriage, and is provided with

three jaws. Although this style of follow rest has been used before, Mr. Shellenbach is believed to be its originator, having designed such a rest over 15 years ago. The steady rest is also shown in detail in Fig. 5, and is mounted on an auxiliary base, which has a key in it to receive the main portion of the rest. Where a lathe is designed with a single V, it is impossible to apply the steady rest to the machine to face in but one direction, but in mounting it as shown, the steady rest will face in either direction, and can be clamped in position by the long cap screw, which is tapped into the clamp and which also takes the tool post wrench.

The countershaft is provided with two friction pulleys and one 18 x 4 in. driving pulley, and where it is not thought necessary to drive in both directions, the machine may be driven at two forward speeds, thus giving 32 changes of speed to the headstock spindle instead of 16, as is ordinarily given with a one-speed countershaft. This machine is manufactured at the present time in 14, 16 and 18 in. sizes, and is also supplied with a three-step cone type of head, which has some novel features. It is also made with a plain set of change gears instead of the quick change, as shown.

Marking Freight Shipments.

All the railroads east of the Mississippi River, operating in the territory covered by the Official Classification, have notified their agents that on and after July 1 they will refuse to receive for transportation all shipments in less than carload lots which are not plainly marked with the name of the consignee, and the station, city and State of destination. For many years it has been customary among shippers to mark their packages with an initial or some hieroglyphic, the key to which would be on the bill of lading. This has been done partly to save time, but also to prevent competitors from observing the names of a shipper's customers on the outside of the packages.

The railroads claim that great abuses have resulted from this practice. It is stated that when a large number of packages are intended for the same consignee, shippers often only mark one or two, the others having no marks at all. If the shipments become mixed with others at transfer points, there is no way of identifying them. The consequences have been great delay, vexation on the part of both shippers and consignees, and claims against the railroad. The Pennsylvania Railroad Company, on its lines east of Pittsburgh, last year paid out \$342,520 for claims for goods "lost in transit," which was an increase of 34 per cent. over 1906. Of this amount \$176,260 was traced to the fact that shippers had marked their goods improperly. During 1907 the Pennsylvania Railroad sent to its Unclaimed Freight Station at Downingtown 18,000 packages on which there were no marks to enable the company to forward the freight to the proper consignee and destination.

Figures prepared by the Trunk Line Association for 17 principal lines in the official classification territory show that the total freight earnings for these companies in 1907 were \$541,725,712, an increase over 1906 of 10.2 per cent. But against this handsome showing of increase, it is stated that the payment for loss and damage by these lines in 1907 was \$5,596,794, which is fully 1 per cent. of the total freight earnings, and an increase over 1906 of 22.4 per cent. It is estimated that about 45 per cent. of loss and damage claims are due to "losses in transit," which means that in 1907 the losses on this account of the lines mentioned were about \$2,500,000. Of this amount, probably upward of \$1,250,000 was caused by the improper marking of the less than carload shipments. It is the design of the railroads now to stop all losses from this cause.

Some of the roads have, for several years, been seeking to remedy this abuse, but competitive conditions rendered it impossible unless all railroads became a party to the more rigid practice. That harmony of action has now been obtained, and as the new rule will be filed by each line with the Interstate Commerce Commission, it is binding upon each road, and any departure from it be-

comes, under the law, a "discrimination." The railroads will enforce the rule not only against all shipments originating on their lines, but agents at transfer points will be instructed to refuse to receive from other railroads any shipments which may by error at originating points have been improperly or inadequately marked.

Some 416 railroads are participating in the enforcement of the new rule. The companies are giving very strict instructions to their agents, placards are to be posted conspicuously in all stations, and every effort will be made to impress shippers with the importance of heeding the new rule. In fact, the campaign of education which is planned by the railroads along this line is almost unprecedented in its thoroughness. It is the belief of the carriers that the enforcement of the new rule will be of great value to the public in the removal of such a prolific source of delays and losses.

The Government Deficit and the Currency.

At the end of April the United States Treasury showed a deficit of over \$50,000,000, as compared with a surplus of over \$55,000,000 a year before, making a difference of \$105,000,000. By the end of May, according to exact figures, up to May 25, the deficit will be about \$62,500,000, as against a surplus of \$65,000,000 at the end of May, 1907. Chairman Tawney, of the House Committee on Appropriations, estimates a deficit of \$65,000,000 at the end of the fiscal year, June 30, and predicts that there will be an "almost certain deficit of not less than \$150,000,000 at the end of the next fiscal year," due, in part, to the falling off in revenues because of hard times and partly to increased Government expenditures.

The New York *Sun* says in its financial review of May 25: "There is every probability that enormous calls must be made by the Treasury upon the public money still held by the national bank depositories; while if the excess of expenditures over receipts still goes on unabated the money thus called in must be paid out again as soon as it is received at the Sub-Treasuries, just as for the same necessity of meeting expenses the paper currency constantly redeemed by the Government is also immediately again placed in circulation. Thus we are face to face again, even if at a somewhat remote distance, with the old difficulty of a redundant currency which in times of depression under our present bungling currency system is not retired but accumulates in large volume in the financial centres and serves the harmful purpose of encouraging unwise speculation, of expelling gold from the country and ultimately of casting shadows upon the country's powers of gold redemption. It is sincerely to be hoped that the outcome of the matter now will not be the same as it was twelve years ago."

An organization of the superintendents and foremen of the metal trades shops of Cleveland will be formed under the auspices of the Cleveland Branch of the National Metal Trades Association at a meeting and banquet to be held at the rooms of the Cleveland Athletic Club on the evening of May 27. The object of the organization is to bring the superintendents, foremen and employees into closer relationship for the discussion of shop conditions and other matters. The social end of the organization will also be an important feature. It may also be decided to include purchasing agents in the membership. It is expected that 100 members will be enrolled in the club at the start.

The largest clock in the world, which stands on the top of the eight-story concrete building of Colgate & Co., soap manufacturers, in Jersey City, N. J., overlooking the North River, was set in motion on May 25. The center of the dial is 145 ft. above the street. The dial is 40 ft. 6 in. in diameter, and the minute hand, which is 20 ft. long, and has a diameter of 3 ft. 6 in. at the hub, weighs 370 lb. The various counterweights of the clock foot up about 1500 lb. The travel of the minute hand is 12 in. per minute. At night the hands are outlined with incandescent lamps, while red lights mark the numerals.

Blast Furnace Calculations.

BY S. J. KOSHKIN, M.E.

Prof. Joseph W. Richards, of Lehigh University, in his "Metallurgical Calculations," deals very clearly with the subject, and no one interested in metallurgy can afford to neglect the study of this able work. The present essay does not pretend to give a full and methodic presentation of all the principles involved in blast furnace calculations, but to those who are familiar with them it may be of some advantage to follow the author in his calculations as they may suggest new ideas even for every-day practice and lead to more accurate results if applied.

Analyses of Materials Used.

All analyses of the materials used have been taken from actual practice and the calculations correspond to conditions which the author has met at two large iron works near Pittsburgh.

Below are the analyses of some of the ores (in natural state) very extensively used.

Name.	Ores.													
	Iron—Fe.		Silica—SiO ² .		Alumina		Al ² O ³ .		Combined bases, CaO, MgO, MnO.		Phosphorus P.		Unfluxed.	
	1906 average.	3-Year limits.	1906 average.	3-Year limits.	1906 average	3-Year limits.	1906 average	3-Year limits.	1906 average.	3-Year limits.	1906 average.	3-Year limits.	1906 average.	3-Year limits.
Group I.....	54.3	53.9-55.8	3.6	3.4-4.1	1.3	0.7-1.8	0.8	0.3-1.0	0.039	0.032-0.040	4.1	3.5-4.8		
Group II.....	54.5	54.0-56.0	3.7	3.3-3.9	1.5	0.9-1.8	0.7	0.3-0.9	0.046	0.038-0.048	4.5	3.8-4.9		
Group III.....	49.1	48.2-52.7	4.9	4.2-5.6	2.7	2.1-3.1	0.7	0.4-0.8	0.086	0.053-0.097	6.9	6.2-7.8		
Barnhart	52.6	50.7-53.0	10.7	10.2-12.2	2.5	2.1-2.8	1.4	0.9-1.7	0.055	0.049-0.072	11.8	11.0-13.3		
Chapin	53.2	52.6-56.1	7.2	6.4-8.2	1.6	1.3-2.0	5.3	3.2-6.0	0.055	0.052-0.059	3.5	3.0-5.4		
Pioneer	59.8	57.0-60.5	4.8	4.2-5.7	2.5	1.5-3.2	0.8	0.5-1.1	0.033	0.028-0.035	6.5	6.1-8.0		

For greater simplicity in the calculation of the "burden," alumina is generally considered an acid (which is not always true) and its percentage is added to the percentage of silica (which also is incorrect, but seems to give close enough results for practice.) If from this "sum" we deduct the "bases" we reach what is called "unfluxed," given in the last column.

A fair average analysis of limestone is the following:

	Per cent.
Iron—Fe	Negligible.
Silica—SiO ₂	4.
Alumina Al ₂ O ₃	1.
Bases (considered as CaO)	53.
Phosphorus	0.006

Such a limestone contains (as we will see further) 45.3 per cent. of "efficient lime" if the "slag" to be produced is a "subsilicate" of what we call the 0.8 type; the difference of 7.7 per cent. of CaO is used to "flux" the silica and alumina with the desired slag as result.

Following are actual limits for the composition of limestones used in the Pittsburgh region:

Name.	Bases in CaO.	SiO ₂ .	Al ₂ O ₃ .	P.	Fe.	Efficient lime.
Pittsburgh	53.3-51.0	3.2-4.8	0.5-2.0	0.006-0.007	0.10-0.28	48.7-44.9
Branch	54.2-51.6	1.7-3.0	0.4-1.8	0.034-0.037	0.20-1.00	51.6-46.9

A fair average analysis for dry coke is:

	Per cent.	Per cent.
Carbon	89	Actually from..... 89.2 to 88.5
Ash	10	Actually from..... 10.0 to 10.5
Volatile matter.....	1	Actually from..... 0.8 to 1.0

And for coke in the "natural state":

	Per cent.	Per cent.
C	84.5	
SiO ₂	5.5	Actually from..... 3.0 to 6.0
Al ₂ O ₃	3.5	Actually from..... 4.5 to 3.0.
S	1.0	Actually from..... 0.75 to 1.15
H ₂ O	5.0	
Fe	0.5	Actually from..... 0.2 to 0.8
P	0.010	Actually from..... 0.010 to 0.025
Bases	Negligible.	

The average composition of ash is:

	Per cent.		Per cent.
SiO ²	56.5	Fe ² O ³	7.25
Al ² O ³	36.0	P ² O ⁵	0.25

To these analyses we must add those of all other products commonly or accidentally used for burdening the furnace, among which are the following:

	Open hearth slag.	Roll scale.	Converter dust.
	Per cent.	Per cent.	Per cent.
Fe	14.0	67.5	52.0
SiO ₂	19.0	1.5	18.0
Al ₂ O ₃	3.0	..	..
Bases	56.0	..	..
P	1.5	0.05	0.05

The open hearth slag is high in phosphorus and in manganese. It is used only for basic open hearth pig iron. Following are typical analyses of such a slag:

	Per cent.	Mean per cent.
Fe	12.74 to 13.23 and higher.	14
SiO ₂	17.98 to 19.30	19
Al ₂ O ₃	2.64 to	3
CaO	34.23 to	36
MgO	10.34 to	11
Mn	5.14 to 7.38	7
P	1.572 to 1.357	1.5

Now we have all the analyses required for an accurate burden calculation. Two more things are necessary:

1. The weight of the coke required for one ton of pig iron produced.
2. The type of slag corresponding to the best running

conditions and the kind of iron desired. This information can be obtained only from actual practice. The amount of coke used is very nearly 1 ton per ton of iron, and the "type" of slag for "basic" and "Bessemer" iron is somewhat poorer in SiO₂ than a "monosilicate"—it is almost accurately, what we will define later as, a 0.8 silicate. There will be given only the accurate method of calculating the amount of limestone required, based on the chemical equivalency,—Al₂O₃ being considered as a base. The results obtained in this way are accurate, and although they do not generally differ very much from those obtained by the so-called rapid methods, it is always preferable to use the theoretical way, as it represents much better the real nature of the chemical processes and in certain particular cases is less liable to lead to error.

Finding the Analyses of Slags.

The method will be explained and all the useful factors required for quick computation will be given, but it is better not to use them blindly, but to reason each time when there is the slightest doubt as to how to use them. It will be easy to compute on the same principle very elaborate tables based on a few standard data and every time make all the required changes, but it will be found on trial that the direct method, here given, is just as quick and does not involve all the accidental errors liable to occur when tables are used. Good tables are to be found in the "Chemical and Metallurgical Hand Book" of Cremer & Bicknell.

The fundamental principles are the following: SiO₂ is the only "acid" in the slag,—Al₂O₃, CaO, MgO, MnO and FeO are all "bases" and may be expressed either in "lime-equivalents" or in "correspondent-silica." In a similar way SiO₂ may be expressed in "correspondent lime." In this manner two methods of arranging the calculations slightly different in form are obtained.

Now, as Al₂O₃ has a somewhat different action than all the other bases, and its proportion in the slag may change its properties to a certain extent, it is advisable to consider it separately, and to see after the whole calculation is done whether the proportion of Al₂O₃ relatively to SiO₂ and CaO (together with the other bases) is about what practice has shown to be right.

The statement that one molecule of CaO is chemically "equivalent" to one molecule of either MgO, MnO,

FeO and only $\frac{1}{3}$ of a molecule of Al_2O_3 (as there are 3 "basic" O instead of 1 in the molecule) means that either of these molecules or parts thereof will behave in exactly the same way relatively to SiO_2 (the only acid) and form silicates of the same "type." The statement that any of the bases "corresponds" to so or so much of SiO_2 , indicates the quantity of the "acid" required to give with the "base" a slag of a certain type. A slag in which the amount of "acid oxygen" (O in SiO_2) is exactly equal to the amount of "basic oxygen" (the sum of O in all the bases) is called a "monosilicate" or of the type 1. If there is less O in SiO_2 than in the combined bases we have a "subsilicate" and the type ($T < 1$), if the opposite happens we have a "super-silicate" ($T > 1$). In blast furnace practice the limits for T are from $\frac{1}{2}$ to $2\frac{1}{2}$, although experimentally all kinds of silicate can be obtained. In common coke blast furnaces T is about 1 and generally less, and for charcoal furnaces about 2. A comparison of a great many slags from "basic" and "Bessemer" iron in the Pittsburgh region shows that T is close to 0.8, and this type of subsilicate has been adopted for the computation.

As a preliminary, a few analyses of blast furnace slags may be given, and one be chosen as an example to show how to find its "type." Then the words "equivalent" and "correspondent" will be clear and the meaning of the "factors of equivalency" and "correspondency" will be obvious.

Analyses of Slags from "Basic" and "Bessemer" Pig Iron.

Com- position.	Bessemer Iron.			Basic iron.		Theoretical mean.
	Fur. I. Per ct.	Fur. II. Per ct.	Fur. III. Per ct.	Fur. IV. Per ct.	Bess. Per ct.	Basic. Per ct.
SiO_2	34.50	34.00	35.30	33.00	34.0	33.0
Al_2O_3	14.96	13.30	14.71	13.80	14.5	14.0
CaO	39.50	42.20	41.90	45.90	39.5	46.0
MgO }	7.78	8.03	5.31	4.85	12.0	7.0
Mn } RO.....	0.63	0.29	0.38	0.63		
Fe }	0.40	0.20	0.40	0.30		
S	1.28	1.48	1.25	1.23	..	..

The two last columns called "theoretical mean" are the results obtained from the following two formulæ representing as nearly as possible the actual composition of these slags:

1. Bessemer Iron Slag—4 (SiO_2) Al_2O_3 , 5 (CaO) 2 (R'O).

2. Basic Iron Slag—4 (SiO_2) Al_2O_3 , 6 (CaO) R''O.

Both slags are of the same 0.8 type, because there are 8 atoms of O in SiO_2 , 10 atoms of O in the combined bases. The symbol (RO) represents the combined bases MgO, MnO and FeO, and as their respective proportions vary the "theoretical equivalent" bases (RO) have in both cases different molecular weights, in the first case it is $\text{R'O} = 43$, in the second (R''O) = 50.

Lime Equivalency.

If CaO be taken as the basis of comparison the following "lime-equivalency" table is obtained:

	3 CaO = 168	Reciprocals.
Al_2O_3	$\frac{\text{Al}_2\text{O}_3}{102} = 1.647$	0.607
MgO	$\frac{\text{MgO}}{40} = 1.400$	0.715
MnO	$\frac{\text{MnO}}{71} = 0.789$	1.269
FeO	$\frac{\text{FeO}}{72} = 0.778$	1.285
Mn	$\frac{\text{Mn}}{55} = 1.018$	0.982
Fe	$\frac{\text{Fe}}{56} = 1.000$	1.000
Bessemer R'O.....	$\frac{\text{R'O}}{43} = 1.302$	0.768
Basic R''O.....	$\frac{\text{R''O}}{50} = 1.120$	0.893

This means that for each part of the base there are so many parts of lime which will be theoretically equivalent, and the reciprocals—that one part of lime is equivalent to so much of any other base.

In considering the silica there will be in the case of a "monosilicate," for each molecule of SiO_2 , 2 atoms of O,

so that there must be taken 2 molecules of CaO to have the ratio $\frac{\text{acid O}}{\text{basic O}} = 1$, whence the deduction is made that

"correspondent lime" is $\frac{2 \text{ CaO}}{\text{SiO}_2} = \frac{112}{60} = 1.867$. If the

slag is a slag of the 0.8 type, $\frac{\text{acid O}}{\text{basic O}} = 0.8$, therefore the correspondent lime is $\frac{2 \text{ CaO}}{0.8 \text{ SiO}_2} = 2.334 =$ the preceding figure divided by the type.

If instead of finding the amount of lime correspondent to one part of SiO_2 in a monosilicate slag any of the other bases of the form RO or $\text{R}'\text{O}$ are considered, then there are two methods of finding the amount of the "correspondent base" either directly by taking one of

the quotients $\frac{2 \text{ RO}}{\text{SiO}_2}$ or $\frac{2 \text{ R}'\text{O}}{3 \text{ SiO}_2}$ or indirectly by dividing the ratio $\frac{2 \text{ CaO}}{\text{SiO}_2} = 1.867$ by one of the other ratios

$\frac{\text{CaO}}{\text{RO}}$ or $\frac{3 \text{ CaO}}{\text{R}'\text{O}}$ given above in the table.

If the slag is not a monosilicate, but, say, of the 0.8 type, the result must be divided by this type. As an example, the calculation may be made how much alumina will correspond to 1 pound of silica if the slag is of the 0.8 type.

The ratio $\frac{\text{acid O}}{\text{basic O}} = 0.8$ shows that for 2 molecules of Al_2O_3 there must be 3×0.8 molecules of SiO_2 or for 2×102 alumina — $3 \times 60 \times 0.8$ of silica, therefore for 1 pound of SiO_2 there are $\frac{2 \times 102}{3 \times 60 \times 0.8} = 1.418$ pounds of

Al_2O_3 . This result can be obtained indirectly as follows: It has been ascertained that 2.334 lbs. of lime correspond to 1 lb. SiO_2 in a 0.8 type slag, now 1 lb. of lime is equivalent to 0.607 lb. Al_2O_3 (see table), and therefore $2.334 \times 0.607 = 1.418$ lb. Al_2O_3 corresponds to 1 lb. SiO_2 as before.

Now, it may be ascertained whether the slag of the composition given above in the column, "theoretical mean Bessemer," really corresponds to the formula 4 (SiO_2) Al_2O_3 5 (CaO) 2 (RO)—(where RO = 43), and also whether without having recourse to this formula by the use of factors of "equivalency" and "correspondency" that the type is a 0.8 slag, as stated. We have:

	Per cent.
4 (SiO_2) = $4 \times 60 = 240$	34.0
Al_2O_3 = 102.....	14.5
5 (CaO) = $5 \times 56 = 280$	39.5
2 (RO) = $2 \times 43 = 86$	12.0
Totals.....	708
Al_2O_3 is equivalent to $1.647 \times 14.5 =$	23.8
CaO is equivalent to.....	39.5
RO is equivalent to $1.302 \times 12 =$	15.6
All bases are equivalent to.....	78.9

If the slag was a monosilicate, then there would be for each part of SiO_2 , 1.867 parts of correspondent lime. Now, there are 34 parts of SiO_2 for 78.9 of CaO, so that in this case the "type" will be:

$$T = \frac{34}{78.9} \times 1.867 = 0.8.$$

This result can be obtained directly in the following way:

$$\begin{aligned} \text{O contained in A parts of } \text{SiO}_2 &= \frac{32}{60} \text{ A.} \\ \text{O contained in B parts of CaO} &= \frac{16}{56} \text{ B.} \\ \text{Ratio } \frac{\text{Acid O}}{\text{Basic O}} = T &= \frac{\text{A}}{\text{B}} \times \frac{32}{16} \times \frac{56}{60} = \frac{\text{A}}{\text{B}} \times \frac{112}{60}. \end{aligned}$$

The figures are $\text{A} = 34$, $\text{B} = 78.9$, $\frac{112}{60} = 1.867$. The result is the same, $T = 0.8$.

Taking Silica as the Basis of Comparison.

There is another method of carrying out the calculation by accepting silica as the basis of comparison instead of lime.

I do not use this method very much. I compute my main tables by reducing all bases to the "equivalent lime" and then find the amount of total lime required

to give with the silica the desired type of slag from which amount I subtract the "equivalent lime" actually present. However, there is no particular reason why this other way should not be adopted if desired.

The result is the following table for "silica correspondence" for various bases in the case of a monosilicate:

	SiO ²		60		Reciprocals.
CaO	2CaO	=	112	=	0.536 1.867
	3SiO ²	=	180		
Al ² O ³	2Al ² O ³	=	204	=	0.882 1.133
	SiO ²	=	60		
MgO	2MgO	=	80	=	0.750 1.333
	SiO ²	=	60		
MnO	2MnO	=	142	=	0.422 2.365
	SiO ²	=	60		
FeO	2FeO	=	144	=	0.416 2.400
	SiO ²	=	60		
Mn	2Mn	=	110	=	0.545 1.835
	SiO ²	=	60		
Fe	2Fe	=	112	=	0.536 1.867
	SiO ²	=	60		
Bess. R'O	2R'O	=	86	=	0.697 1.433
	SiO ²	=	60		
Basic R''O	2R''O	=	100	=	0.600 1.667

This means that to each part of the base there are so many parts of "correspondent" silica in the case of a monosilicate and the reciprocals—that one part of SiO² corresponds to so much of any other base under the same assumption.

If the direct numbers of this table be multiplied by the "type" then is ascertained the amount of SiO² correspondent to one part of the base. If the reciprocals are divided by the "type," the amount of the base correspondent to one part of SiO² is reached. Selecting, for instance, Al²O³ we obtain by multiplying 0.882 (see table) by 0.8 the figure 0.706 as the amount of SiO² correspondent to 1 pound of Al²O³ in a slag of the 0.8 type. If the reciprocal 1.133 is divided by 0.8, then 1.418 is obtained, as the amount of Al²O³ correspondent to 1 pound of SiO² in the same slag, a figure which has been previously found by the direct method.

The following is a useful table of the correspondence of lime to silica for different types of slag. It has been computed between the limits of 0.75 to 1.25 for the types, but it is very easy to enlarge these limits if desired.

Type = T.	1	Corr. lime.	Corr. silica.	Composition of slag.	
	T			Equiv. CaO.	Corr. SiO ² .
0.75	1.333	2.489	0.402	71.3	28.7
0.80	1.250	2.334	0.428	70.0	30.0
0.85	1.177	2.196	0.455	68.7	31.3
0.90	1.111	2.074	0.482	67.5	32.5
0.95	1.053	1.965	0.509	66.3	33.7
Monosil.	1.000	1.867	0.536	65.1	34.9
1.05	0.952	1.778	0.562	64.0	36.0
1.10	0.909	1.697	0.589	62.9	37.1
1.15	0.870	1.623	0.616	61.9	38.1
1.20	0.833	1.556	0.643	60.9	39.1
1.25	0.800	1.494	0.669	59.9	40.1

With this table and the "lime equivalency" table there are found at once the results given in the "silica correspondence table" for different bases (whose figures have been conveniently multiplied or divided by T).

As an illustration of the use of this table together with the "lime equivalency" table let there be sought once more the correspondence of Al²O³ to SiO² in the case of a 0.8 slag. From the last table there is ascertained that for this type 2.334 CaO corresponds to 1 of SiO² and also that 0.428 SiO² corresponds to 1 of CaO. From the first table it is noted that 1 of CaO is equivalent to 0.607 of Al²O³ and 1 of Al²O³ is equivalent to 1.647 of CaO. Combining these figures: 2.334 × 0.607 of Al²O³ corresponds to 1 of SiO², or 1.418, and 0.428 × 1.647 of SiO² corresponds to 1 of Al²O³, or 0.706. Both results have been obtained previously in a different way.

The last two columns of the preceding table give the composition of the slag in "equivalent lime" and "correspondent silica." This theoretical composition of the slag must not be confounded with the "probable analysis" which will differ to a certain extent owing to the fact that all the "bases" other than CaO, and even

Al²O³ have been reduced to a single base—CaO. To illustrate the effect which the introduction of "equivalent lime" has on the percentage of SiO² there are presented four different slags of the same 0.8 type in which the percentage of SiO² varies from 30% to 34%.

Formula.	SiO ² .	Al ² O ³ .	CaO.	R'O.	R''O.
(1) 4(SiO ²) 10(CaO)	30.0%	...	70.0%	...	...
(2) 4(SiO ²) Al ² O ³ 7(CaO)	32.7	13.9	53.4	...	...
(3) 4(SiO ²) Al ² O ³ 6(CaO) R'O)	33.0	14.0	46.0	7.0	...
(4) 4(SiO ²) Al ² O ³ 5(CaO) 2(R'O)	34.0	14.5	39.5	...	12.0

R'O—combination of bases of the mean—molecular weight of 50, R''O molecular weight of 43.

In practice it will be often sufficiently accurate to neglect the effect of the bases of the type RO other than CaO and to simply add their percentage to that of the lime without previously using the lime—equivalency factors as shown above. The influence of Al²O³ should not be neglected. There should be studied the question whether no relative proportion to the other two main constituents—SiO² or CaO is within the desired limits.

Before making the burden calculation the efficiency of the typical limestone should be studied. The lime under consideration carries 4 per cent. of silica, 1 per cent. of alumina and 53 per cent. of lime.

The slag is to be of the 0.8 type. Referring to the lime equivalency table it will be found that 1 per cent. of Al²O³ is equivalent to say 1.64 CaO, so that the total amount of CaO may be placed at 54.64. From the silica correspondence table there will be found that for the 0.8 type one per cent. of SiO² correspondent to 2.334 CaO and 4 per cent.—to 9.34. This figure must be subtracted from 54.64, leaving 45.3 as the "efficient lime"; in other words, 1 lb. of efficient lime is contained in $\frac{1.0}{0.453} = 2.2$ lb. of limestone.

The Burden Calculation.

The following mixture of ores is used in the burden:

	lb.
Group III.....	16,500
Group II.....	5,000
Barnhart	6,000
Open hearth slag.....	1,500
Converter dust.....	1,000
Total	30,000

The following are the average analyses:

Name.	Fe.	SiO ² .	Al ² O ³ .	CaO.	MgO.	Mn.	P.	S.
Group III.....	50.0	5.0	2.5	0.5	...	...	0.09	0.10
Group II.....	55.0	3.5	1.5	0.5	...	...	0.05	0.10
Barnhart	52.0	11.0	2.5	1.5	...	...	0.06	0.10
Open hearth slag.....	14.0	19.0	3.0	36.0	11.0	7.0	1.50	0.10
Converter dust.....	52.0	18.0	...	...	...	...	0.05	0.10
Coke	0.5	5.5	3.5	...	...	...	0.01	1.00
Limestone .....	...	4.0	1.0	53.0	...	...	0.006	...

It is assumed that the pig iron produced will contain the whole iron present, which will form 95 per cent. of its composition, and that this pig iron will contain one per cent. of silicon, 3.75 per cent. of carbon, half of the manganese present, all of the phosphorus and no sulphur.

This is certainly only hypothetical but does not differ much from the actual analysis and may be taken as the basis of the calculation. It is further assumed that 15,500 lb. of coke will be used for the 30,000 lb. of ore.

The slag to be produced must be of the 0.8 type and contain the whole of the sulphur. This is certainly an assumption since part of the sulphur burns out and part goes into the iron. It is nevertheless better to be on the conservative side. The slag will also contain the other half of the manganese as MnO and all the magnesia.

To give a better oversight the balance sheet per charge is at once given, although it requires the previous calculation of the amount of limestone needed. The iron is supposed to be in the ore as Fe²O³; the balance to 100 per cent in each case has been taken as "moisture." This gives: Average moisture of ore, 16 per cent.; of coke, 5 per cent., and of limestone, $\frac{1}{3}$ per cent.

At this stage of the calculation there has not yet been computed the total amount of blast required to give a gas of a certain fixed composition, so that the figures are put down as "gas constituents," most of the carbon remaining yet theoretically unburned.

The Balance Sheet of the Charge.

Charges.	Pig Iron.	Slag.	Gas constituents.
1. Ore. (30,000 lb.)			
FeO ^s 21,220.0	Fe ... 14,850.0	.....	O ... 6,370.0
SiO ² .. 2,125.0	Si 1,07.0	SiO ² ... 1,789.1	O ... 178.9
Al ² O ³ .. 682.5	.....	Al ² O ³ .. 682.5	.....
CaO ... 737.5	.....	CaO ... 737.5	.....
MgO .. 165.0	.....	MgO ... 165.0	.....
MnO .. 135.4	Mn ... 52.5	MnO ... 67.7	O ... 15.2
P ² O ⁵ .. 100.6	P ... 44.1	.....	O ... 56.5
S 30.0	.....	S 30.0	.....
H ² O ... 4,804.0	.....	.....	H ² O .. 4,804
2. Coke (15,500).			
C 13,094.0	C 589.0	.....	C 12,505
Fe ... 77.5	Fe ... 77.5	.....	.....
SiO ² .. 852.5	.....	SiO ² .. 852.5	.....
Al ² O ³ .. 542.5	.....	Al ² O ³ .. 542.5	.....
P ² O ⁵ .. 3.5	P 1.5	.....	O ... 2.0
S 155.0	.....	S 155.0	.....
H ² O .. 775.0	.....	.....	H ² O .. 775.0
3. Limestone (7,616).			
CaCO ³ .. 7,208.5	.....	{ CaO .. 3,712.8	CO ² .. 3,172.0
SiO ² ... 304.6	.....	{ Ca ... 231.2	O ... 92.5
Al ² O ³ .. 76.2	.....	SiO ² ... 304.6	.....
P ² O ⁵ ... 1.0	P 0.4	Al ² O ³ .. 76.2	.....
H ² O ... 25.7	.....	.....	O ... 0.6
		.....	H ² O .. 25.7
Totals 53,116.0	15,772.0	9,346.6	27,997.4
	Fe ... 14,927.5	SiO ² ... 2,946.2	C ... 12,505.0
	Si ... 157.0	Al ² O ³ .. 1,301.2	CO ² .. 3,172.0
	Mn ... 52.5	CaO ... 4,450.3	O ... 6,715.7
	P ... 46.0	MgO ... 165.0	H ² O .. 5,604.7
	C ... 589.0	MnO ... 67.7	.....
	.....	CaS ... 416.2	.....
	15,772.0	9,346.6	27,997.4

If reduced to percentages, we find the composition of the pig iron and slag to be respectively as follows:

Fe	94.65	SiO ²	31.52
Si	1.00	Al ² O ³	13.92
Mn	0.33	CaO	47.62
P	0.29	MgO	1.77
C	3.73	MnO	0.72
	100.00	CaS	4.45
			100.00

To verify that the slag is of the desired 0.8 type the computation is as follows: Each of the bases is reduced to the equivalent lime by using the proper factors, then the amount of silica is multiplied by $\frac{112}{60} = 1.867$. The result is:

SiO ²	31.52 × 1.867 = 58.847
Al ² O ³	13.92 × 1.647 = 22.926
CaO	47.62 × 1.000 = 47.620
MgO	1.77 × 1.400 = 2.478
MnO	0.72 × 0.789 = 0.568
	73.592

By taking the quotient, $T = \frac{58.847}{73.592}$ we find $T = 0.8$;

also 30 per cent. SiO² for 70 per cent. CaO (equivalent).

To find the necessary amount of limestone to produce the results given above the following method is pursued:

First there is figured out the following table giving the composition of the charge in weight:

Ore.	Wt.	Fe	SiO ²	Al ² O ³	CaO	MgO	Mn	P	S
Group III.	16,500	8,250	825	412.5	82.5	...	14.85		
Group II.	5,000	2,750	175	75	25	...	2.50		
Barnhart.	6,000	3,120	660	150	90	...	3.60		
O. H. slag	1,500	210	285	45	540	165	105	22.50	30
Conv. dust.	1,000	520	180	...	...	...	0.50		
Coke.....	15,000	77.5	852.5	542.5	...	...	1.55		155

Totals... 14,927.5 2,977.5 1,225 737.5 165 105 45.50 185

The 14,927.5 Fe will give ÷ 0.95=15,713 of pig iron containing 1 per cent., or 157 lb. of silicon reduced from $157 \times 2.14 = 335.9$ lb. SiO², and leaving, therefore, 2641.6 SiO² in the charge.

Now by using the lime equivalency factors the total amount of equivalent lime for each of the bases is ascertained as follows:

Al ² O ³	1,225 × 1.647 = 2,017.6
CaO	737.5
MgO	165 × 1.400 = 231
½ Mn.....	52.5 × 1.018 = 53.4

Total equivalent lime = 3,039.5

If the slag to be produced were a monosilicate 1 lb. of SiO² would correspond to 1.867 lb. of CaO, but in the case of a 0.8 type the quantity is 2.334 lb. instead. Multiplying the 2641.6 lb. of silica by this figure it is ascertained that 6165.5 is the amount of lime required; of this there is already available 3039.5 lb., leaving only 3126 lb.

to be furnished. But there are also 185 lb. of sulphur which require a certain amount of CaO to become CaS. Obviously one molecule of CaO corresponds to one atom

of sulphur, or, as $\frac{56}{32} = 1.75$, this means that each pound of S requires 1¾ lb. of lime and 185 lb., about 324 lb., which added to the previous 3126 lb. give 3450 lb. of lime to be furnished by the limestone. It has been calculated that the limestone contains 45.3 per cent. of efficient lime, so that the total amount of limestone to be added is $3450 \div 0.453 = 7616$, which was the figure accepted.

The Blast and the Escaping Gases.

It remains now to calculate the amount of blast and to deduce the composition of the escaping gases.

It is assumed that the average combustion of carbon in the furnace is: $3 C + 2 O^2 = CO^2 + 2 CO$, or that 36 lb. of carbon requires 64 lb. of oxygen to give 44 lb. CO² and 56 lb. CO, and also that two molecular volumes of O² will produce with 3 C one molecular volume of CO² and two of CO; in other words, that the ratio $\frac{CO}{CO^2}$ by volume will be as $\frac{1}{2}$ and by

weights as $\frac{56}{44}$. From this equation the following ratios are computed:

1 lb. carbon produces.....	$\frac{56}{36} = 1.5556$	CO
1 lb. carbon produces.....	$\frac{44}{36} = 1.2222$	CO ²
1 lb. carbon requires.....	$\frac{64}{36} = 1.7778$	O

Half of the total amount of O, or $\frac{32}{36} = 0.8889$, gives CO and the other half CO².

The amount of carbon burning to CO is $\frac{24}{36} = 0.6667$.

The amount of carbon burning to CO² is $\frac{12}{36} = 0.3333$.

The carbon to be considered is the total carbon—it is the 12,505 carbon in the balance sheet under coke, and the carbon contained in 3172 of CO² in the limestone. The last quantity is $\frac{12}{44} = 0.27273$ of 3172 parts, or 865.1 lb., giving altogether 13,370.1 lb. as the total carbon.

The oxygen present is the sum of the 6715.7 "free" oxygen in the ore, in the balance sheet, and the remaining 2306.9 oxygen of the 3172 CO² in the limestone, or altogether 9022.6 lb.

The gas constituents contain:

Total C.....	13,370.1
Present O.....	9,022.6
H ² O	5,604.7
Total.....	27,997.4

By multiplying the total carbon by 1.7778, a total of 23,769 is arrived at as the oxygen. Deducting therefrom the oxygen present, there is ascertained that 14,746.4 is the amount of oxygen to be furnished by the blast.

It is assumed that the air contains 1 per cent. moisture. This moisture will be dissociated at the tuyeres into free O and H. If the normal composition of dry air by weight is accepted as O = 23.1 per cent. and N = 76.9 per cent., then air containing 1 per cent. moisture is composed as follows:

O	22.869
N	76.131
H ² O	1.000
Total.....	100.000

And after dissociation at the tuyeres:

O	23.758
N	76.131
H	0.111
Total.....	100.000

And for 1 lb. of O:

O	1.0000
N	3.2044
H	0.0047

Air..... 4.2091

This gives for the..... 14,746.4 lb. O
47,253.4 lb. N.
69.3 lb. H

62,069.1 lb. air.

The composition of the gases by weight will be found to be:

	Pounds.	Per cent.
CO	20,797.9	23.0917
CO ²	16,341.2	18.1435
N ²	47,253.4	52.4650
H ²	69.3	0.0770
H ² O	5,604.7	6.2228
Totals	90,066.5	100.0000

In order to ascertain the composition of these gases by volume, Professor Richards' method may be followed, based on the following consideration: If the composition of the gases be expressed in "ounce molecules," their respective volumes in cubic feet are arrived at by multiplying with 22.22.

Standard conditions in volumes are arrived at as follows:

	Cubic feet.	Per cent.
CO	$\frac{20,797.9 \times 16}{28} \times 22.22 = 264,073.8$	23.5968
CO ²	$\frac{16,341.2 \times 16}{44} \times 22.22 = 132,036.9$	11.7984
N ²	$\frac{47,253.2 \times 16}{28} \times 22.22 = 599,983.1$	53.6124
H ²	$\frac{69.3 \times 16}{2} \times 22.22 = 12,318.8$	1.1008
H ² O	$\frac{5,604.7 \times 16}{18} \times 22.22 = 110,698.7$	9.8916
Total	$\frac{90,066.5 \times 16}{28.61} \times 22.22 = 1,119,111.3$	100.0000

The density of the gas relative to H will be $\frac{28.61}{2} = 14.305$, a little lighter than dry air, whose density is 14.4.

With the same method the composition in volume of the blast after dissociation, but at standard conditions, is as follows:

	Cubic feet.
O ²	$\frac{14,746.4 \times 16}{32} \times 22.22 = 163,832.5$
N ²	$\frac{47,253.4 \times 16}{28} \times 22.22 = 599,983.1$
H ²	$\frac{69.3 \times 16}{2} \times 22.22 = 12,318.8$
Total	$\frac{62,069.1 \times 16}{28.43} \times 22.22 = 776,134.4$
Leaving for the gas constituents	342,976.9
Total	1,119,111.3

From this the result in volume is:

	Cubic feet.	Per cent.
O ²	$\frac{14,195 \times 16}{32} \times 22.22 = 157,706.4$	20.483
N ²	$\frac{47,253.4 \times 16}{28} \times 22.22 = 599,983.1$	77.925
H ² O	$\frac{620.7 \times 16}{18} \times 22.22 = 12,259.5$	1.592
Totals	$\frac{62,069.1 \times 16}{28.66} \times 22.22 = 769,949.0$	100.000

The density of this air is 14.33 relative to hydrogen. The factor of dissociation is 1.00803—its reciprocal 0.99203. So it has been found that 769,949 cu. ft. was the theoretical amount of blast required under standard conditions for a single charge. For 80 charges or per 24 hr. this makes 61,595,920 cu. ft., and per minute, 42,775. To give an idea of the size of the blast engines required to produce the necessary blast there may be presented some data on engines working under similar conditions at one of the Carnegie plants near Pittsburgh. They were vertical compound double relief blast engines, built by Allis-Chalmers—two for each furnace. Their principal dimensions were: Diameter of air cylinders, 84 in.; diameter of steam high pressure cylinders, 44 in.; low pressure cylinders, 86 in., and stroke, 60 in. With a steam pressure of 150 lb. and from 35 to 45 rev. per min. they developed about 1800 hp. each. The average speed of the piston was about 400 ft. per minute; the maximum was 600 ft. With 40 rev. per min. for each engine both furnished 61,600 cu. ft. per minute. If they run 23 hr. a day this makes 85,008,000 cu. ft. of air at, say, 62 degrees F. Under standard conditions they will furnish about 95 per cent. thereof, or 80,757,600 cu. ft. Deducting 20 per cent. for losses, this gives 64,606,080 cu. ft. as the approximate amount of air delivered to the furnace during a day. Theoretically it has been found that 61,595,920 cu. ft. are required for 80 charges of 30,000 lb. of ore each, giving an output of about 600 gross tons of pig iron.

It is of great interest to compare the relative quantity of the various materials and products. The following table has been computed from the data discussed, and the results agree very closely with the actual working conditions in this region:

Comparative Table of Materials and Products.

Name.	Weight—Lbs.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
	Vol.—Cu. ft.	Ore.	Limestone.	Burden.	Coke.	Air, wt.	Air, vol.	Gases, wt.	Gases, vol.	Slag.	Pig iron.
1. Ore	30,000	1.00000	3.93908	0.79753	1.93549	0.48333	0.038963	0.33309	0.026807	3.20973	1.90211
2. Limestone	7,616	0.25387	1.00000	0.20247	0.49135	0.12270	0.009892	0.08456	0.006805	0.81484	0.48288
3. Burden	37,616	1.25387	4.93908	1.00000	2.42684	0.60603	0.048855	0.41765	0.033612	4.02457	2.38499
4. Coke	15,500	0.51687	2.03519	0.41206	1.00000	0.24972	0.020131	0.17209	0.013850	1.65836	0.98275
5. Air, wt.	62,069.1	2.06897	8.14983	1.65007	4.00446	1.00000	0.080615	0.68915	0.055463	6.64082	3.93540
6. Air, vol.	769,949	25.66497	101.09624	20.46866	49.67413	12.40470	1.000000	8.54867	0.688000	82.37742	48.81745
7. Gases, wt.	90,066.5	3.00222	11.82596	2.39437	5.81074	1.45107	0.116977	1.00000	0.080480	9.63628	5.71053
8. Gases, vol.	1,119,111.3	37.30371	146.94217	29.75094	72.20074	18.03009	1.453490	12.42540	1.000000	119.73460	70.95557
9. Slag	9,346.6	0.31155	1.22723	0.24848	0.60301	0.15059	0.012140	0.10377	0.008352	1.00000	0.59261
10. Pig iron.	15,772	0.52573	2.07090	0.41929	1.01755	0.25411	0.020485	0.17511	0.014094	1.68746	1.00000

This shows that the blast after dissociation has a density of 14.215 relative to H and forms 69.35 per cent. by volume of the gases.

The furnace under consideration was a 600-ton furnace 100 ft. high. The average number of charges in 24 hr. was 80, so that the total amount of gases produced was $1,119,111.3 \times 80 = 80,528,904$ cu. ft., or 62,172.9 cu. ft. per minute. In weight it was $90,066.5 \times 80 = 7,205,320$ lb. in 24 hr., and 5003.7 lb. per minute. The air blown in was 62,069.1 lb. per charge, 4,965,528 lb. per day and 3448.3 lb. per minute.

The amount of air in cubic feet before dissociation is obviously not the same as after, so that 776,134.4 cu. ft. found previously does not show accurately the real amount of air driven into the furnace.

Before the dissociation of H²O the composition of the 62,069.1 lb. blast were:

	Per cent.
O ²	22.869
N ²	76.131
H ² O	1.000
Totals	100.000

The American Manganese Bronze Company.—The American Manganese Bronze Company, which was organized some time ago, occupies offices at 99 John street, New York City, as announced in the issue of April 30. This company will make a specialty of copper alloys and various other alloys brought out by Charles R. Spare, formerly chemist at the Cramps shipyards, Philadelphia. Among these products will be Spare's manganese bronze, Spare's white bronze, and Spare's hydraulic bronze. The company will also manufacture regular United States Government alloys and will specialize on marine hydraulic work. A new factory will be located on the outskirts of Philadelphia at Holmesburg, Pa. U. T. Hungerford is president of the company, Charles R. Spare, vice-president, and William A. Lock, secretary and treasurer.

The W. R. Beatty Machinery & Equipment Company, 613 House Building, Pittsburgh, Pa., has been appointed agent for the Pittsburgh District for the line of punches and shears made by the Cincinnati Punch & Shear Company, Cincinnati, Ohio.

Economical Lubrication of Large Plants.*

BY WILLIAM M. DAVIS.†

In lubrication the first consideration is efficiency, then economy. For efficient lubrication the most important thing is lubricant of good quality; next reliable appliances for feeding the oil, so that every drop will go directly to the bearing surfaces. For slow-speed engines, ordinary sight-feed cups are satisfactory, but for heavy high-speed work a continuous oiling system is most efficient. From an economic standpoint, however, the success of such a system will depend entirely upon the means to catch the oil after it leaves the bearings.

Catching the Excess of Oil from Bearings.

With slow-speed engines and all machinery that uses oil in quantities, every bearing should have substantial sheet-steel pans, arranged, if possible, to drain the oil to some central point from which it can be taken to the filter. If the engine is of the horizontal crank case type, care should be taken to keep the oil as free from water as possible, as water will sometimes travel along the piston rod into the crank case, and, if it is the least bit alkaline, as may be the case where compounds are used in the boilers, the oil and water together will sometimes form an emulsion which is hard to separate and lowers the quality of the oil. The above would not apply, of course, to the vertical steam engine, which uses water in the crank case.

To secure economical lubrication, the first thing is to stop the leaks. Every piece of machinery should be provided with drip pans to catch the oil. In a large plant where several engines are close to one another, the oil pans may be piped to a central tank, whence it can be pumped to the filter. On slow-running engines where the pressure is not excessive, and on slow-running shafting, a good grade of grease or tallow compound will often give good results, but where compression cups are used the grease should be quite soft so that it will spread freely. If too hard, great pressure will be required to feed it, and it will also tend to increase the friction load.

Where the hub of a flywheel or large gear is so close to the bearing that there is not sufficient space to fasten oil pans under the bearing all excess of oil will be lost. Such bearings can often be lubricated economically by packing a lump of medium hard grease on the journal at each end of the bearing and feeding a little oil in the middle. The grease will prevent the oil from running out too fast, and at the same time help to lubricate.

Cylinder Lubrication.

The proper amount of oil that should be used will have to be determined by experiment. A good quality of oil should be provided, and to get economical results the conditions should be made as favorable as possible—*e. g.*, the steam should be dry; the water in the boilers not too high; an excess of strong alkaline boiler compounds avoided; and, above all, the piston rings should not be set out too tight. Before putting the rings in the piston the edges should be chamfered off slightly with a file, for if they are sharp they will tend to scrape the oil from the surface. From the lubricator the discharge pipe should extend into the center of the steam pipe, so that the oil will drop into the current of steam. Where the engine speed is constant there is little choice between a force feed pump and an ordinary sight feed lubricator. Either will give efficient and economical service if properly taken care of, but where the work is intermittent, the engine stopping and starting, the force feed pump is more economical.

To determine the proper amount of cylinder oil to use, make the conditions as favorable as possible, then gradually reduce the oil feed and note the action of the valves. If they work smoothly all right, but if they commence to groan increase the oil feed slightly. After this the cylinder head should be removed and the surface of the

cylinder examined. If it looks oily, and when wiped with a piece of soft paper a stain is left on the paper, it is certain that enough oil is being used.

The Receiving, Handling and Distributing of Lubricants.

If the plant is a large one the oil house should contain storage tanks sufficient to hold a tank car of each kind of oil. By purchasing the oil in cars there will be a saving in the price per gallon and in labor of handling the oil and empty barrels. In a small plant where only a few barrels of each kind of oil are used a month, tanks holding from 2 to 10 barrels should be provided, so arranged that the oil can flow by gravity from the barrels to the tanks. Care should be taken to see that the barrels drain out clean.

It is customary in a large plant to have a man in charge of the oil house who receives and stores all lubricants, issues and charges them up to the various departments, keeping a record of the amounts given out in a book or on suitable blank forms. To limit the daily amount of lubricants for each department, the chief engineer or master mechanic, when making his daily rounds, can give each engineer an order for his day's supply of oil and grease, and thus know if the amounts required are increasing or decreasing; or an allowance may be made each engine room or department per day or week, which cannot be exceeded except by written order to the oil house storekeeper. At the end of the month the storekeeper totals the amounts of lubricants used and obtains the total cost.

Reduction of Cost.

Nearly all plants spend more than is needed for lubrication, due partly to wasteful methods in use, partly from using unsuitable lubricants, and often to paying prices higher than necessary. The first can be greatly prevented by systematic methods of issuing the lubricants and charging them to the different departments and by installing more economical appliances.

In regard to more suitable lubricants in many plants there is often slow-speed machinery, on which it is not practicable to recover the oil used, in which case a good grade of dark lubricating or black oil will often answer as well as the more expensive oils. A works that was using large quantities of an expensive grade of cylinder oil on its machinery where a heavy machine oil would have answered equally as well, could have effected a saving amounting to over \$2,000 a year.

To purchase good lubricants at the lowest prices, it is best to buy on specifications, asking bids and awarding a contract for a year's supply to the lowest responsible bidder.

Grease.

Greases can often be used with good economy, but they have their limitations. Where the speeds and pressure are low, if they are of the proper consistency and fed to the bearings by suitable compression cups, they often give excellent results. Greases are what is known as "plastic lubricants"; their particles have far less tendency to free movement than is the case with oils. Many greases have as their base a petroleum oil combined with some animal fat, the whole solidified by combining them with a solution of caustic soda, lime water or other alkalies, making a plastic compound that will vary in its lubricating value according to the proportions and the quality of its component parts. While greases have certain advantages as regards cleanliness, ease of application, &c., if used on general mill and factory machinery they will tend to add to the friction load over what it would be if oil were used. To see what this would amount to in the case of the plungers of water works pumping engines, a test was made on a vertical compound pumping engine running under a constant load and at 20 rev. per min., having four plungers, two being 31½ in. in diameter and two 22 in. in diameter, all having a uniform stroke of 64 in. The plungers were packed with square hemp packing, which had been well soaked in oil, and several times a day were swabbed with oil. Two sets of indicator cards were taken. The first with the plungers lubricated with oil showed the engine to be developing 762.67 hp. The plungers were then smeared

* Abstract of a paper read before the Boston Society of Civil Engineers, December 18, 1907, and printed in full in the Journal of the Association of Engineering Societies.

† Arthur D. Little Laboratory, Boston, Mass.

with soft grease and another set of cards taken which showed the engine to be developing 835.17 hp., making an increase of 72.5 hp., or over 10 per cent. In this particular case grease would have been a very expensive lubricant to use. On the other hand, there are places where grease is the only lubricant that can be used. In rolling mill work, owing to the nature of the duty and the construction of the machinery, it is the only lubricant that can be used successfully. On rolls used for rolling rails, structural steel and in merchant mills, the journals or necks are kept flooded with water, and a saponifiable grease must be used, that is, one containing a large per cent. of fatty oils, so that it will adhere to the wet surfaces. In sheet steel and tin plate mills where it is impracticable to use water, and the journal or neck temperatures often go over 400 deg., a dense grease compounded with a large per cent. of high flash test petroleum oil must be used.

The Flohr Improvement of the Basic Bessemer Process.

While it does not give actual figures relating to the saving in costs, Dr. P. Goerens' account of the Flohr improvement of the basic Bessemer process is the most admirable review of the conditions affecting that process which we have yet seen in print. From that account, published in *Stahl und Eisen*, we take the following:

The process has been worked out by J. Flohr at the Duedelingen works and has been introduced at a number of other basic Bessemer plants. When pig iron containing carbon, silicon, manganese and phosphorus is blown in a basic converter the first three elements named are oxidized until the dephosphorizing period. Probably these elements are eliminated in this manner: The oxygen entering the bath partly oxidizes some of the excess of the iron, forming a ferrous oxide whose tendency is to go into solution at once. But encountering in the solution substances whose affinity for oxygen to iron is greater at the prevailing temperature, they are oxidized at the expense of the ferrous oxide. The different foreign substances are oxidized and ferrous oxide is again reduced to iron. The rapidity with which these reactions proceed varies with the different substances, and is dependent upon the temperature and the character of the slag present.

As high a temperature as possible is likely to affect favorably the course of the process. The silicon is lowered to traces in the first few minutes. Therefrom there remain, for the first period, chiefly carbon and manganese. So long as carbon is present a notable dephosphorization cannot take place, particularly since there does not yet exist a suitable solvent for the phosphoric acid. If it be the aim to shorten the decarbonizing period, then the carbon must be burnt as rapidly as possible, and this is dependent upon the temperature of the bath, which is due to the fact that the affinity of carbon for oxygen rises more rapidly with the temperature than does that of iron and of manganese. If the temperature during the first period is relatively low, then carbon burns more slowly and a larger quantity of manganese is oxidized.

How the High Temperature is Obtained.

In order to attain this advantageous high temperature during the decarbonizing period a number of methods are at hand. Care should be taken that the heat of the pig iron as it comes from the mixer or the cupola is as high as possible and that the converter itself be hot. This is particularly desirable in those plants where scrap and skulls are charged into the converter with the pig iron. But in such cases, too, a minimum of cooling additions will be made at the outstart, because every cooling during the decarbonizing is unfavorable.

Conditions are different, however, during the dephosphorizing period, in the so-called "afterblow." Unlike carbon, phosphorus possesses the property that its affinity for oxygen grows more slowly as the temperature rises than does that of iron and of manganese. The result is that phosphorus burns more slowly the higher is the tem-

perature of the metal bath; and the less phosphorus is oxidized the more iron is burnt, unless the latter is protected against oxidation by a high percentage of manganese. Therefore, while it is desirable to have as high a temperature during the first period, it is advantageous to keep it low during the afterblow, in order to promote the oxidation of phosphorus and limit the burning of iron.

It is obvious that this cannot be done by starting with a charge cooled at the outstart with an excess of scrap and of lime, because decarbonizing would proceed too slowly. Then a larger proportion of manganese would be consumed, and the result would be that toward the end of the process there would not be enough manganese to protect the iron and the waste would run up.

The Colder Blow During Dephosphorizing.

In order to attain the desired colder blow during the dephosphorizing period a number of steel works use additions of lime or of scrap, or of both, which they charge into the converter at the beginning of the afterblow. Cooling by means of additions of lime is not advantageous, for these reasons: Aside from the increased cost of larger lime additions, the fact must be considered that the lime is a poor conductor of heat, for which reason the cooling of the bath aimed at by it does not occur quickly enough, unless complete action is awaited by stopping the blow for a while. By the addition of lime the highly calcareous slag has its melting point raised, it becomes less fluid and the absorption of phosphoric acid is delayed. A thick slag, too, entangles larger quantities of iron and thus contributes to increased losses. Nor is the method of cooling by additions of scrap worthy of commendation, quite apart from the high cost. In consequence of the low specific heat of iron energetic cooling calls for a considerable quantity of scrap, and it takes considerable time before it is melted. During this time the bath is filled with half melted pieces of iron, which thicken the bath and increase the resistance against the blast.

Flohr's method skillfully avoids the disadvantageous cooling with lime or with scrap. It consists of charging toward the end of the decarbonizing period, or somewhat later, a mixture of substances containing ferrous oxide, like hammer and roll scale, and of slaked lime, preferably made up into briquettes. A rapid and intense action upon the bath is apparent, and after the briquettes have been added it needs only a relatively short blow to finish the heat. Dr. Goerens goes into some very interesting heat calculations to explain this cooling action.

The briquettes consist of a mixture of roll scale and slaked lime. Sometimes the addition of a certain percentage of manganese ore may be advantageous, since it increases the fluidity of the slag and helps the dephosphorization. The roll scale is screened in order to get rid of the larger particles of iron, and is then ground together in a Chili mill with burnt lime. The lime slakes through the presence of water in the roll scale and the mixture heats up. Then the adequate amount of slaked lime is added. A sample of the mixed material after three days showed 1.06 per cent. of iron shot, 31.40 per cent. of iron oxide, 44.70 per cent. of ferrous oxide, 9.89 per cent. of lime, 4.16 per cent. of water and 0.68 per cent. of carbonic acid. Of this material briquettes are made.

The briquettes are best added when the condition of the flame shows a hot heat and when the clinder is liquid enough to allow the briquettes to pass through it. In order to effect the additions the blow is either stopped and the briquettes are charged by hand or the additions may be made during the heat. The quantity depends upon circumstances. At times the blow is unexpectedly hot, which leads to higher cost, through increased waste and larger consumption of lime, and to leaner basic slag. In order to avoid too high a cost of pig iron many basic Bessemer plants must blow a pig iron carrying 0.5 to 1 per cent. of silicon and upward. It is evident that such a silicon contents must be unfavorable, must lead to high consumption of lime and low phosphoric contents of the slag. The blow is exceptionally hot, so that the cooling effects of roll scale briquettes is particularly advantageous.

When Working on Cupola Metal.

In the case of a steel plant working on cupola metal the conditions are generally more favorable, because the

silicon in the pig is somewhat lowered during the remelting in the cupola. In this case two advantages may be expected when the scale briquettes are added during the dephosphorizing period. In consequence of the low silicon the rise in temperature of the bath at the beginning of the process is very small. The affinity of carbon for oxygen is weakened. During this period combustion will extend more to the manganese, so that the manganese contents are small at the beginning of the afterblow. Many steel works seek to avoid the drawbacks of a long decarbonizing period by adding considerable quantities of scrap during the melting in the cupola, in order to crowd down the carbon contents. This method is economically unsound, because there are added to the scrap certain quantities of carbon which must be oxidized later in the converter. The quantity of coke required in remelting, too, is large. In view of the high cost of scrap and the advantages of utilizing it in the open hearth furnace this method should not be commended. During the afterblow there is burnt, besides the phosphorus, a quantity of iron, which increases as the manganese is lowered. A further consequence of low manganese is that the blown metal may carry in solution more oxygen, which calls for increased additions of ferromanganese for its elimination.

The Flohr process leads to the combustion of a certain percentage of the phosphorus without the development of heat. By thus keeping the temperature down the affinity of the balance of the phosphorus for oxygen is increased, and, besides, the finely divided lime in the briquettes aids dephosphorization. During the final blow less iron is oxidized and the blown metal is lower in oxygen, and therefore needs less ferromanganese for deoxidation.

Dr. Goerens summarizes the advantages as follows:

1. The waste is considerably reduced.
2. The consumption of lime is lessened and the capacity of the slag for absorbing phosphoric acid by dissolved ferrous oxide is increased.
3. The contents of phosphoric acid of the slag is increased in proportion to the lessened waste and the lessened contents of lime.
4. The losses by blowing out metal mechanically are lessened in proportion to the shortened blow.
5. The afterblow is shortened and the productive capacity is correspondingly increased.
6. The consumption of steam is lowered in proportion to the shortened heat.
7. In consequence of the shortening of the heat and of the lower temperature in the converter the bottom and the lining are saved, and they will stand a larger number of heats.

The Lake Superior Mining Institute.

The thirteenth annual meeting of the Lake Superior Mining Institute, which was appointed for 1907 and postponed, will be held on the Mesaba and Vermillion Ranges of Minnesota, beginning Wednesday, June 24, and continuing to Saturday, June 27. Local committees are preparing the programme and an interesting trip is promised. The last meeting on these ranges was in August, 1902. Many changes have taken place in the interval. A number of papers will be presented and the paper of Dr. B. W. Jones on "Mine Sanitation," read at the Houghton meeting in 1906, will probably be further discussed. The secretary, A. J. Yungbluth, Ishpeming, Mich., announces that the following papers have already been prepared for the meeting:

- "Sampling of Iron Ores," by Prof. L. S. Austin, Houghton, Mich.
- "Biographical Sketches," by J. H. Hearing, Eveleth, Minn.
- "The Standard Boiler House of the Oliver Iron Mining Company," by A. M. Gow, Duluth, Minn.
- "Automatic Throttle Closing Device for Hoisting Machinery," by Spencer S. Rumsey, Duluth, Minn.

The sampling of ore at mines and at upper and lower lake docks have been receiving much attention from Lake Superior iron mining companies, and will be discussed with interest at the coming meeting. Thomas F. Cole, Duluth, Minn., president of the Oliver Iron Mining Company, is president of the institute.

Our Duluth correspondent states that the opening session will be held at that city June 24, and the institute

will meet the next morning at Ely, Vermillion range, followed by an inspection of the Pioneer, Sibley and Savoy mines. The Vermillion will be left that noon and the first Mesaba point will be Blwabik, the mine of that name being looked over during the afternoon. The same afternoon the party will reach Virginia, and the first regular evening session will be held there that night. The following morning mines near by and at Eveleth will be passed through cursorily, and a second evening session will be held at Hibbing. The following day will be passed around Hibbing. It has not yet been decided if a visit will be made to Coleraine. The idea of the management is that Coleraine is not far enough along yet to show what it will be, and that a trip there would necessarily require so much explanation, or so much to be taken on faith and with the prophetic eye, so to speak, that it would not be advisable. The 27th will be spent at Duluth, and that evening the session will close. The probabilities are favorable for a very large attendance.

Bessemer Steel and Puddled Iron in Great Britain in 1907.

The British Iron Trade Association has collected statistics showing that the production of Bessemer steel ingots in the United Kingdom in 1907 was 1,859,259 gross tons, against 1,907,338 tons in 1906, 1,974,210 tons in 1905 and 1,781,533 tons in 1904. The output of 1907 thus showed a decline of 48,079 tons from that of the previous year and 114,951 tons from that of 1905. The figures do not include the production of a number of small converters used in Sheffield, which is considered to be not over 30,000 tons. The district of West Cumberland and Lancashire leads in Bessemer steel production with a total of 527,662 tons in 1907. South Wales is second with 407,737 tons. Sheffield and Leeds together produced 331,697 tons, the Cleveland District 377,809 tons, and Staffordshire and other territory 214,354 tons. The production of acid and basic Bessemer steel in recent years was as follows in gross tons:

	Acid.	Basic.	Total.
1907.....	1,280,315	578,944	1,859,259
1906.....	1,307,149	600,189	1,907,338
1905.....	1,396,233	577,977	1,974,210
1904.....	1,129,224	652,309	1,781,533

The production of Bessemer steel rails in Great Britain in 1907 was 832,576 tons, as compared with 854,740 tons in 1906, a decline of 22,164 tons. The production of Bessemer bars was 321,138 tons; of blooms and billets, 245,644 tons; of general merchant steel, 72,728 tons. The total of finished and semifinished Bessemer steel products is put at 1,556,548 tons, this including rails and small quantities of channels, squares, rounds, tees, &c., not separated by the manufacturers. It is stated that the 392,711 tons difference between the above total and the output of Bessemer ingots in 1907 is accounted for by crops and other mill loss and by the unascertained output of fishplates, castings, plates, sheets and other products of relatively small tonnage. The total number of Bessemer converters in operation in 1907 averaged slightly under 56, and the average of inactive converters was 11. Of 18 different Bessemer works active in 1907, but one produced over 200,000 tons, while five produced between 100,000 and 200,000 tons.

The Output of Puddled Iron.

The British Iron Trade Association has also compiled statistics of the production of puddled iron in the United Kingdom in 1907, showing a total of 975,083 tons of puddled bars, or 35,263 tons less than in 1906, though an increase of 36,525 tons over 1905. The number of puddling furnaces in operation in 1907 was 1202, as against 1246 in 1906 and 1261 in 1905. The principal products in the finished iron industry in Great Britain are bar iron, which is approximately 45 per cent. of the whole; sheets and plates, which are 12 per cent.; strips and hoops, which are 12 per cent., and rounds and squares, which are about 8 per cent. of the total. The production of finished iron and steel by so-called finished iron works amounted to 1,162,058 tons in 1907. It is stated that the increase over the production of puddled iron is due to the working up at iron rolling mills of considerable quantities of blooms and billets.

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The Iron Age Directory.

There is now being mailed to every subscriber a copy of the twelfth annual edition of THE IRON AGE DIRECTORY, which is a classified index of all the goods manufactured by regular advertisers in *The Iron Age*. Bound in red, and of convenient size for desk use, it is a volume of nearly 350 pages, and is unique in that it is far more searching in its classification than is usual in works of this character. We know that many readers of *The Iron Age* use it constantly in seeking for the names of makers of that very large variety of articles produced by hardware, iron and machinery manufacturers. We feel convinced that one or two tests of its merits will commend it to others.

British and American Steel Production.

The publication of the statistics of open hearth and Bessemer steel production in Great Britain in 1907 makes possible a comparison, both as to tonnage and processes, with the figures for the United States. In the following table the record for the past four years for ingots and castings is given in gross tons:

	United States.		Great Britain.	
	Bessemer.	Open hearth.	Bessemer.	Open hearth.
1907.....	11,667,549	11,549,088	1,859,259	4,663,489
1906.....	12,275,830	10,980,413	1,907,338	4,554,936
1905.....	10,941,375	8,971,376	1,974,210	3,838,072
1904.....	7,859,140	5,908,166	1,781,533	3,245,346

It will be noticed that the fluctuations in British steel production are very moderate in contrast with what occurs in this country in a three-year interval. Another difference is that while Great Britain produces nearly half as much basic Bessemer as acid Bessemer steel (578,944 tons and 1,280,315 tons, respectively, last year), there is no basic Bessemer steel produced in the United States. A third important difference is that in the United States the open hearth steel production is very largely basic, while in Great Britain the preponderance is with acid steel. For 1907 the figures were as follows:

	Acid		Basic	
	open hearth.	Gross tons.	open hearth.	Gross tons.
United States.....		1,269,773		10,279,815
Great Britain.....		3,384,780		1,278,709

It thus appears that the acid open hearth steel production in the United States last year was almost the same as the basic open hearth steel production in Great Britain, while the basic open hearth steel output in this country was three times that of acid open hearth steel in the United Kingdom. The proportion of basic open hearth steel has been growing in Great Britain, however. In 1901 the total was but 351,177 tons; last year it was

more than three and a half times that amount. In 1903 the ratio between acid and basic steel in Great Britain was 5 to 1; last year it was less than 3 to 1. The figures show plainly the increasing use of British phosphoric ores and the effort to avoid increasing dependence upon foreign low phosphorus ores.

The Development of Woodworking Machinery.

The woodworking departments of some important shops and factories have not been given the same careful attention and study in the effort to secure highly developed and economical production as have those departments which are devoted to the manufacture of metal parts. In a great many industrial establishments the machining of wood is a more or less important factor in manufacturing. The machine shop, of course, has its pattern room. In general, manufacturing wood may enter into the product itself, or be turned into boxes and cases for goods. Equipment for doing the work is worthy of detailed consideration, that no unnecessary expense may be entailed. Where wood is a chief factor in a product, the manufacturer gives to this class of machinery the same degree of attention that the machine shop manager devotes to his metal working tools. But in works where the wood room is by comparison a minor department, there is a sharp contrast between its machinery, often bearing the imprint of age and a corresponding degree of efficiency and economy, and the essentially modern equipment of the machine shop.

Woodworking machinery has made conspicuous strides in recent years. The advance has not been so great as with machine tools, for the reason largely that the influence of the high speed steels has not been nearly so marked. Yet this factor has entered into the evolution of woodworking tools, and is believed to be destined to become a much more important one as time goes on. It has been demonstrated that such steel has an important place in the working of wood, largely because it can be given a finer edge than the carbon steels, and at the same time maintains its edge much longer. The engineers who have worked out this adaptation of the metal are confident that their theories have been justified by results; that the rate of feed may be increased and that a slower speed of the head is practicable. The cutters are not costly, because they are simply pieces cut from bar stock and may be sharpened by grinding in the head. Moreover, experience has shown that because of the keener edge a better finish is obtained than with the older type of knives—a result the reverse of that secured with the same steels in metal working, where they are useful for rapid reduction only. One machinery builder has featured the cutters in heavy matching machines, and makes the statement that the records of production exceed those of the carbon steels and that the knives endure at least three times as long. In circular saws the steel has been used with excellent results, the body of the saw forming a tool holder for specially designed teeth.

Apart from the influence of the high speed steels, woodworking machinery has been developed in general design in the natural evolution resulting from study by specialized designers. Advantage has been taken of mechanical improvements and new materials adaptable to machinery generally. Features of greater strength or power, or of refinement of design have been introduced. Altogether, woodworking machinery has gone ahead with most satisfactory progress, and is worthy the attention of manufacturers who have use for this class of equipment. Especially is it commended to those who have paid little attention to their woodworking department, putting forth

scarcely any effort to maintain it on the level of efficiency found in other branches of their works.

Case Hardening by Gas.

The same causes under the same conditions produce the same effects, although seemingly contradicted sometimes in iron and steel working. With every endeavor made to reproduce the conditions precisely the results are frequently not those expected. Sooner or later, however, investigation reveals that some factor has been overlooked. Some years ago a certain firm had difficulty in its case-hardening. It seemed to have repeated the cause, but could not repeat the effect. At least the difficulty was found to be grease in the clay used for sealing, which got into it from the machine manipulating it. So many factors enter into the processes through which iron and steel are put, that there is often no certainty that the conditions are really repeated. Whenever a process is introduced which eliminates uncontrollable factors or places them within control, a definite advance has been made.

This seems to be true of the new process for case-hardening by gas described elsewhere in this issue. In the old process there are many factors difficult to control connected with variations in the chemical constitution of the packing and the manner of surrounding the work with it. At one stroke these factors are eliminated; there is no packing to be handled or mishandled. The carbon supply is uniform because it comes from a gas, the pressure of which is everywhere the same, and the circulation constant. Since in addition the temperature may be ascertained and controlled throughout the retort, it would appear that scientific case-hardening is nearly achieved.

The carbonizing gas is now admitted to the work under some pressure, and the article hints at possibilities by case hardening under high pressures. This is a dangerous but fruitful field of research. If mild steel at 1500 degrees F. absorbs carbon from a carbonaceous atmosphere under ordinary pressure, deeper and more rapid carbonization may be expected with increased pressure; deep carbonization hitherto has been difficult to secure, and the old process was very slow. The new process is already faster, but conducted under pressure may accomplish in minutes what now takes hours.

Still more attractive is the suggested possibility of manufacturing high carbon steels from milder forms. The new process is so accurately controlled that it would seem to afford an ideal means of regulating the carbon supply, both as to amount and purity. Certain forms, as sheets and bars, may perhaps be converted into steel in their final form. While absolute homogeneity may prove impossible by this means, still by proper working a commercial product may be obtained, especially in the finer grades. Here also carbonization under high pressures may develop importance.

Definite knowledge as to costs is not at hand. Likely they have not yet been minimized, but if the new process becomes as economical as it appears effective, great changes can be looked for in the manufacture of machines and steel articles generally. Take steel machine shafts alone. Rigidity is one of the main essentials, and a case hardened mild steel shaft, even though the skin be very thin, is considerably stiffened. By increasing the penetration the necessary rigidity should be secured with a much reduced diameter. Both a smaller shaft and a harder surface reduce friction, consequently, smaller, lighter and more efficient machines may be expected. A

hardened surface being less subject to wear, case hardening contacting parts here and there will prolong the life of a machine. With the additional possible applications to nails, heads of screws, &c., the new process evidently has a very promising future.

Labor Bureaus and Workmen's Records.

The labor bureaus maintained by the various branches of the National Metal Trades Association are taking advantage of the industrial situation by perfecting and extending their records of workmen. There is, unhappily, little to do as yet in placing men in employment, because the demand for additional labor is comparatively insignificant. But the opportunity for compiling facts that go to show the value of a man to an employer is an unusually fruitful one, and the records will be of much value when the works of members of the association shall begin to fill up again. Records of workmen have always constituted an essential feature of the work of most of the labor bureaus. Trustworthy information regarding applicants for positions is of vital importance to manufacturers in hiring help. In times of full employment, a manufacturer is often misled by the man who falsely states his experience and skill, and works some time until his true status is discovered, an experience which proves quite expensive. The more complete the record of the Labor Bureau, the greater the protection of its members from this type of imposition. At the same time the worthy workman is established at his true value. Whenever possible the wages paid by former employers are included on the card of each man, together with his personal characteristics as to constancy of labor, sobriety, contentment, absence of undesirable affiliations, and the like. A man having a good record will be eagerly sought; even in dull times he may be hopeful of receiving continuous work. The knowledge of his qualifications is of value, both to employers and to himself.

During a period of great industrial activity it is difficult to compile a comprehensive list of workmen. Of course, no labor bureau record will ever be complete, because new men will constantly enter the field, either because they are beginning their careers or because they come from other communities. The bureaus will eventually exchange their lists, which will add to the efficiency of each office, and at the present time there is active co-operation between them in exchanging information regarding applications for employment. With large numbers of men seeking work, many individual records are obtained from them and afterward verified, which can be done in a large percentage of cases. The manufacturers are actively assisting in the work, giving all possible information concerning men who have been on their payrolls. The result should prove one of the benefits which must always commingle with the losses of an inactive market.

CORRESPONDENCE.

Prosperity Preaching and Prosperity Practice.

To the Editor: Over in St. Louis they have organized a National Prosperity League, and a branch has been formed in another large city in the Middle West. This is the way the president of the branch talked for publication:

"Of course there is nothing wrong with this country. We have all the money we ever had and all the natural resources we ever had. We have all the equipment for prosperity except confidence. The only thing needed now

for the country to resume business at the same old stand is to restore confidence. Let the people go out and buy and let them go out and sell; let them resume business the way they were doing 12 months ago. The way to resume business is to resume. Start everything off with a hurrah, and we will forget everything about the panic in a day or two. We must let bygones be bygones. We must run our factories full and we must go out and face the world with a spirit of optimism which is bound to overcome all obstacles."

With a newspaper clipping in his pocket containing this speech one of our representatives the next day called on the head of the Prosperity League branch to sell him some pig iron, and then the gentleman talked in this way:

"Why, you must be crazy to ask me to buy any pig iron at such prices. Pig iron is going to go to pieces; the market is rotten. I think that Southern pig iron will go to \$10, and then some. It does not cost you more than \$6 to make it. If you have got anything attractive along about \$9.50, perhaps I would consider it, but I would not promise to buy even at that price. What! \$15.50 at the furnace for Northern iron? Come off. I bought Northern iron once for \$12. It will go there again. You cannot hold prices up, you have got to come down. No, I would not give you an order at \$12, but I would consider it."

"Now, young man, all you pig iron men are robbers. You have been having your own way too long. The buyer is going to have his way now. You go away and come back in about a month, and when you are ready to chop off \$3 or \$4 per ton you will be talking sense. I have wasted enough time fooling with you on any such ridiculous basis as the prices you are asking."

All of which goes to show that between preaching and practice there is a wide difference.

PIG IRON SELLER.

CINCINNATI, May 20, 1908.

Steel Prices to Be Maintained.

Much more interest than usual has attached to the meeting of steel manufacturers which occurred in this city last Thursday. The impression had been gaining ground that a disposition to reduce prices had been increasing in the ranks of the manufacturers. In some quarters this belief became so pronounced that predictions were being quite freely made that a general reduction would be agreed upon. It is probable that the cultivation of this expectation of a lower level of prices prevented the placing of a considerable amount of business in the past week or two. It appears, however, that the reports of disagreement among the manufacturers were not well founded. After the meeting, the following announcement was issued by Judge E. H. Gary, chairman of the United States Steel Corporation:

"At the meeting to-day of representatives of the principal manufacturers of steel in this country, the opinion was expressed by each one present that the prices of steel are reasonable and should not be reduced; that reduced prices would not increase purchases; and that most of their customers do not expect or desire any changes. The opinion was unanimous that the meetings should be discontinued for the summer months unless the chairman should deem it advisable to meet at any time for reasons which do not now appear."

On the evening of the same day the representatives of the various steel companies, together with men of prominence in allied lines of business from all parts of the country, participated in a banquet at the Waldorf-Astoria. On this occasion Judge Gary presided, opening the postprandial exercises with an address in which he spoke with great satisfaction of the harmony existing among the various interests represented. He gave con-

siderable attention to the recently organized American Iron and Steel Institute, stating that the list of members was large and steadily increasing and that he had no doubt that substantial benefit would be derived from the development of the plans upon which it had been established. Addresses were made by quite a number of others present, nearly all of whom had something of encouragement to say with regard to the future. The general feeling shown indicated the conviction that trade had seen its worst, and that while improvement might be slow, any change in conditions would be in the direction of better business.

Noteworthy features of this occasion were the strong expressions of esteem and even affection for Judge Gary. Every allusion of this kind was received with great applause. Some of the speakers gave definite instances of the consideration shown to the general interests of the trade by the United States Steel Corporation under his guidance. It was plainly apparent that the selection of this gentleman as chairman of the General Committee of the iron and steel trades was not simply because of the domination of the United States Steel Corporation. While his selection may have been made at the beginning because of the vast interests controlled by his corporation, it is now evident that his personality as a man of broad views, generous impulses and conciliatory disposition has so impressed itself upon the members of the trade that his fitness for the position is universally recognized.

The Iron and Steel Manufacturers' Dinner, May 21.

Following is a list of those present at the dinner of iron and steel manufacturers, at the Waldorf-Astoria, New York, May 21:

MORRIS BACHMAN, president Sharon Steel Hoop Company, Pittsburgh.
EDWARD BAILEY, president Central Iron & Steel Company, Harrisburg, Pa.
GEORGE BARTOL, general manager Otis Steel Company, Cleveland, Ohio.
FRANK J. BILLINGS of Tod, Stambaugh & Co., Cleveland.
C. W. BRAY, president American Sheet & Tin Plate Company, Pittsburgh.
W. L. BROWN, chairman American Shipbuilding Company, Chicago.
E. J. BUFFINGTON, president Illinois Steel Company, Chicago.
JOHN A. BURDEN, president Burden Steel & Iron Company, Troy, N. Y.
J. G. BUTLER, JR., president Bessemer Ore Association, Youngstown, Ohio.
J. A. CAMPBELL, president Youngstown Sheet & Tube Company, Youngstown, Ohio.
H. S. CHAMBERLIN, president Roane Iron Company, Chattanooga, Tenn.
E. A. S. CLARKE, president Lackawanna Steel Company, New York.
D. M. CLEMONS, president Carnegie Natural Gas Company, Pittsburgh.
THOS. F. COLE, president Oliver Iron Mining Company, Duluth, Minn.
E. S. COOK, president Warwick Iron & Steel Company, Pottstown, Pa.
DANIEL COOLIDGE, president Lorain Steel Company, Philadelphia.
GEO. W. COFE, *The Iron Age*, New York.
H. COLBY, president Pittsburgh Steamship Company, Cleveland.
GEORGE G. CRAWFORD, president Tennessee Coal, Iron & Railroad Company, Birmingham, Ala.
T. I. CRANE, of Pilling & Crane, Philadelphia.
H. G. DALTON of Pickands, Mather & Co., Cleveland.
CHARLES DEERING, chairman International Harvester Company, Chicago.
W. B. DICKSON, second vice-president United States Steel Corporation, New York.
A. C. DINKEY, president Carnegie Steel Company, Pittsburgh.
THOMAS A. EDISON, Orange, N. J.
R. H. EDMONDS, *Manufacturers' Record*, Baltimore, Md.
B. F. FACKENTHAL, JR., president Thomas Iron Company, Easton, Pa.
J. A. FARRELL, president U. S. Steel Products Export Company, New York.
E. C. FELTON, president Pennsylvania Steel Company, Philadelphia.
W. J. FILBERT, comptroller United States Steel Corporation, New York.
E. H. GARY, chairman United States Steel Corporation, New York.

JAMES GAYLEY, first vice-president United States Steel Corporation, New York.
 T. W. GUTHRIE, president Republic Iron & Steel Company, Pittsburgh.
 E. M. HAGAR, president Universal Portland Cement Company, Chicago.
 J. A. HATFIELD, president American Bridge Company of New York, New York.
 AUSTIN HECKSCHER, president R. Heckscher & Sons Company, Philadelphia.
 JOS. H. HOADLEY, president Alabama Consolidated Coal & Iron Company, New York.
 JAMES H. HOYT, Cleveland, Ohio.
 C. R. HUBBARD, president Wheeling Iron & Steel Company, Wheeling, W. Va.
 A. F. HUSTON, president Lukens Iron & Steel Company, Coatesville, Pa.
 O. W. HUTCHINSON, president Grand Crossing Tack Company, Grand Crossing, Ill.
 ARCHIBALD JOHNSTON, president Bethlehem Steel Company, South Bethlehem, Pa.
 J. R. JONES, secretary Alan Wood Iron & Steel Company, Philadelphia.
 W. V. KELLEY, president American Steel Foundries, Chicago.
 I. A. KELLEY, president Ashland Steel Company, Ashland, Ky.
 D. G. KERRE, president Pennsylvania & Lake Erie Dock Company, Pittsburgh.
 WILLIS L. KING, vice president Jones & Laughlin Steel Company, Pittsburgh.
 O. P. LETCHWORTH, Buffalo, N. Y.
 JAMES LORD, president American Iron & Steel Mfg. Company, Lebanon, Pa.
 C. H. McCULLOUGH, vice-president Lackawanna Steel Company, Buffalo.
 GEORGE G. MCMURTRY, chairman American Sheet & Tin Plate Company, New York.
 CHARLES MACVEAGH, general solicitor United States Steel Corporation, New York.
 BENJAMIN NICOLL, Wharton Steel Company, New York.
 EDWIN N. OHL, president United Iron & Steel Company, Pittsburgh, Pa.
 W. P. PALMER, president American Steel & Wire Company, Cleveland, Ohio.
 LEONARD PECKITT, president Empire Iron & Steel Company, Catasauqua, Pa.
 JOHN A. PENTON, *Iron Trade Review*, Cleveland.
 GEORGE W. PERKINS of J. P. Morgan & Co., New York.
 H. F. PERKINS of International Harvester Company, Chicago.
 VERYL PRESTON, president Eastern Steel Company, New York.
 J. H. REED, president Bessemer & Lake Erie Railroad Company, Pittsburgh.
 DAVID REEVES, president Phoenix Iron Company, Philadelphia.
 JOHN REIS, assistant to president United States Steel Corporation, New York.
 F. B. RICHARDS of M. A. Hanna & Co., Cleveland, Ohio.
 FERD. W. ROEBLING of John A. Roebling's Sons Company, Trenton, N. J.
 WALLACE H. ROWE, president Pittsburgh Steel Company, Pittsburgh.
 Z. G. SIMMONS, JR., Simmons Mfg. Company, Kenosha, Wis.
 I. M. SCOTT, president La Belle Iron Works, Steubenville, Ohio.
 C. M. SCHWAB, chairman Bethlehem Steel Company, New York.
 F. C. SMINK, chairman Reading Iron Company, Reading, Pa.
 F. B. SMITH, president Crucible Steel Company, Pittsburgh.
 H. S. SNYDER, vice-president Bethlehem Steel Company, South Bethlehem, Pa.
 W. P. SNYDER, president Shenango Furnace Company, Pittsburgh.
 POWELL STACKHOUSE, president Cambria Steel Company, Philadelphia.
 MOSES TAYLOR, vice-president Lackawanna Steel Company, New York.
 ALEX. THOMPSON, president Inland Steel Company, Chicago.
 JOHN A. TOPPING, chairman Republic Iron & Steel Company, New York.
 W. R. WALKER, assistant to president United States Steel Corporation, New York.
 F. S. WITHERBEE, Witherbee, Sherman & Co., Port Henry, N. Y.
 F. W. WOOD, president Maryland Steel Company, Sparrows Point, Md.
 EDWARD WORCESTER, vice-president National Tube Company, Pittsburgh.
 W. P. WORTH, Worth Bros. Company, Coatesville, Pa.
 CHARLES H. ZEHNDER, New York.
 AUGUST ZIESING, president American Bridge Company, Chicago.

The American Railway Association's statistics show that on May 13 there were 404,534 idle freight cars on the country's railroads, or 9071 less than the high-point figures reported at the close of April. The Eastern, Northwestern and Canadian groups of railroads show the largest percentage of improvement.

Attention is called in a recent circular of C. W. Leavitt & Co., 220 Broadway, New York, to the results secured from aluminum-magnesium alloy castings, containing 8 to 10 per cent. pure magnesium. Comparisons are made, as to lightness, strength and ease of machining, with castings made from aluminum and copper.

PERSONAL.

Van Leer Wills has been appointed general manager of the blast furnaces of the Northwestern Iron Company, Mayville, Wis.

A. H. Breese, for a number of years in charge of the heating and plumbing departments of the Chicago House Wrecking Company, is now engaged with the Central Machinery & Supply Company, 547-559 State street, Chicago, of which company he is a member.

L. V. Calhoun, 930 First National Bank Building, Chicago, has succeeded William B. Walter & Co., formerly in the Marquette Building, as district agent for the Detroit Steel Casting Company, Detroit, Mich.; American Casting Company, Birmingham, Ala.; St. Louis Malleable Casting Company, St. Louis, Mo.; Love Bros., Inc., Aurora, Ill.

The Link-Belt Company recently made several changes in its official staff. James M. Dodge is now chairman, S. Howard Smith treasurer, and C. A. Fry vice-president, all at Nicetown, Philadelphia; Charles Piez president and S. B. Peck vice-president and secretary, Chicago, and Glenn G. Howe vice-president, Indianapolis, Ind.

Professor Herman Schneider, dean of the Department of Engineering, University of Cincinnati, who has recently returned from visits to various large manufacturing centres in the New England States, where he explained the Cincinnati plan of co-operative education in the shops and the University, has instituted a system of correspondence with educational factors and public-spirited citizens in the large manufacturing cities in southern and central Ohio. It is intended to interest the machinery manufacturers of these cities in the plan and secure their co-operation with those of Cincinnati, where the plan is most successful.

Labor Notes.

The *Review* of the National Founders' Association says that several stove foundries at Philadelphia, Chicago, Albany, N. Y., and Quincy, Ill., are studying how to increase the number of molding machines they are now using. It adds that "the theory that stove plate cannot be made on the molding machine has been exploded." In some of the union stove foundries where the operators of molding machines have been classed as apprentices the manufacturers now contend that the practice is unfair, since the number of new journeymen is so limited as not to take care of the increasing demands of the business.

After a ten months' struggle to enforce their demands for a nine-hour day and increase of a cent an hour in wages, members of the Machinists' Union, at Fitchburg, Mass., on May 24, voted to declare the strike off.

Thirty-five thousand coal miners of Missouri, Kansas, Oklahoma and Arkansas, members of the United Mine Workers of America, who have been on strike since March 1 last, have returned to work, an agreement between miners and operators having been signed. Prices and conditions are to remain the same as they were last year.

A Contract for Lackawanna Sheet Piling.—The Lackawanna Steel Company, Buffalo, has received an order from the McArthur Bros. Company, contractor, for 7000 tons of sheet steel piling to be used in the construction of the cofferdam for the 800 ft. lock the contracting company is to build for the Government at the Black Rock harbor end of the United States ship canal at Buffalo. The sheet piling will be made under patents controlled by the Lackawanna Company. Some weeks ago preliminary orders for 100 tons each of several types of sheet piling were placed by McArthur Bros. Company and tests of these have been in progress recently. The contract with the Government for the cofferdam and lock amounts to \$825,000.

The National Machine Tool Builders' Association.

Proceedings of the Closing Session of the Spring Convention Held at Atlantic City, May 19 and 20.

The semiannual convention of the National Machine Tool Builders' Association, the opening proceedings of which were reported in *The Iron Age* of May 21, came to a close on the following afternoon after one of the most successful sessions ever held by the organization. The proceedings of the second day of the convention, which were in part outlined in our telegraphic report, were of particular interest, and many problems which come before machine tool manufacturers came up for discussion.

One of the developments of the session was that it was found necessary to increase the special committees, and preliminary steps were taken by the appointment of a committee to revise Article 3, section 1, of the constitution referring to the eligibility of members. The chairman of the various committees now in existence were asked to prepare lists of all members of machine tools along their particular lines. This action will probably result at the next convention of the naming of a Committee on Grinders and perhaps a number of other groups of machine tool manufacture.

Committee Reports.

A report made by Israel H. Johnson, Jr., Philadelphia, as chairman of the committee "to meet the National Supply and Machinery Dealers' Association Committee when necessary," was of particular interest. Mr. Johnson stated that certain members of the association were not entirely satisfied with the draft of a uniform selling agreement with agents as drawn up by the committee. It has been pointed out, he said, that the members had not been satisfied with the stipulation as regards the course to be followed in reference to prices on stocks ordered or in dealers' hands after the manufacturer announces a change in prices. The committee was not unanimous in its recommendation, and accordingly the entire matter was referred to the Executive Committee, and copies of the plans proposed are to be mailed to the members for definite action at the New York meeting. The Committee on Foundry Matters, through C. H. Norton, Worcester, Mass., as chairman, presented a minority report, as was mentioned last week, and a majority report bearing the signature of P. E. Montanus, Springfield, Ohio, and P. G. March, Cincinnati, was submitted to the convention. These reports, giving opposing views on the question of the responsibility of the foundryman for unsatisfactory work, were of much interest. Mr. Norton said, in part:

The Minority Report.

After due consideration a list of questions was sent to our members, intended to bring out the facts in regard to our experience with foundries, to determine, if possible, whether we had cause for complaint. Replies were received from 60 members. Eleven of these members report having their own foundry, and these also report that they have experienced none of the troubles indicated by the list of questions sent out. It is very gratifying to know that people owning their own foundry are free from trouble.

From the questions and answers it would seem evident that the machine tool builder buying castings is handicapped by the necessity of carrying on his shoulders a part of the business of the foundries; that the business methods of the foundries warrant an official protest from us as an organization, and that we, as an organization, take some steps to break up the traditional methods of doing business with foundries, and insist that the iron foundries, like all others with whom we do business, shall take their legal and just burden upon themselves and transact their business with us precisely as we have to do with our customers; that they be responsible for their product, and that they know before their product leaves their works, the same as we have to know before our product leaves our works, whether it is suitable for the use of their customers or not.

A directly opposite view was taken by the majority of the committee, which in its report stated that Mr. Norton's recommendation as a committee report was "con-

siderably 'jug-handled' in character," and was "altogether from the standpoint of the buyer of castings." Continuing the report stated:

The Defense of the Foundryman.

It goes without saying that any one who has had any business at all with the foundries, or has been connected with them directly, knows that many elements, many conditions, many complications arise in daily practice that are difficult to analyze and subject to results over which the foundryman has no immediate control. It is a well-known business fact that the average foundry has not been the financial success that perhaps other businesses are. Largely owing to the fact of the low prices prevailing, the usual buyer of castings seeks absolutely the lowest market, and then expects the best results and the best goods. Such is not the case where fair prices are given for the goods, and when fair prices are given the buyer usually can demand the high excellence that our worthy chairman expects.

We really also believe that the answers to the questions did not show careful attention on the part of the replies, in so far as that on question 3 some of the answers gave a variation of weights in castings as high as 10 to 15 per cent., and one even giving 30 per cent. variation in weight of a large casting. As to questions 4 and 5, we think it no more than fair and proper that the buyer should visit the foundry, furnish blue prints for castings, and even follow them up day by day in case there should be the slightest possibility of a doubt on the part of the foundryman to understand them.

Do not forget that you should not expect the foundryman to know all the details at sight of the castings that you may want, and on which you have yourselves given many hours of thought, beginning from the designing down to the finished pattern.

AS TO INSPECTING CASTINGS.

We are firm in the belief that the average foundryman inspects all the castings before delivering if they show evidence of being imperfect, but it is no more than fair and natural to suppose that in case of a doubtful casting the buyer should be requested to use it if possible, and when it cannot be used at all, no foundryman should object to taking it back, without prejudice.

As to question 10, regarding uniform quality of iron, trade conditions and the source of supplies make it almost impossible for the foundryman to guarantee or even expect uniform quality. Questions 12, 13 and 14 apply largely to the mechanical end of the foundry, and when glaring inaccuracies take place, like misplaced cores, name plates upside down or entirely omitted, the foundryman needs no defense and should not expect it.

We believe that no foundryman can afford to pay for labor on castings that at first examination appear good but on machining develop defects, unless the initial contract price is sufficient to prohibit the foundryman to object to allow such charges to be entered against him.

How many buyers of castings in our association do not send formal orders with their patterns? How many patterns are frequently sent without numbering, and is it not possible that there is a lax system in vogue, in the ordering of castings, that makes it a burdensome problem for the foundryman to keep track of said patterns? Is it not possible, also, that the designer and maker of patterns frequently place a dowel pin (metal or otherwise) in such a place that it is absolutely nonmechanical from the foundryman's point of view?

Questions 27, 28 and 29 are simply ones of detail in foundry practice, and would require considerable space to properly analyze and explain.

REGARDING PROMPT PAYMENT.

The foundryman pays spot cash for his material and labor. Do we always pay our foundry bills promptly, absolutely according to contract?

This report is merely to draw your attention to the golden rule of "give and take"; believing that the average foundryman is ready at all times not to quibble and quarrel with his customers, but to do the fair thing. Have we not all found him accommodating many times? Have we not frequently sent patterns late in the afternoon with the request to have them put in immediately for to-morrow's use? Have we not canceled orders for many of the pieces, after they were made? Have we not asked for castings which, on examination and research, we found had never been formally ordered? Have we not been requested many times to alter patterns that would facilitate better results or quicker operations and not granted them? In other words, and finally, are there not two sides to the question?

We do not wish to drive the job foundry out of business, but if all the conditions as indicated by the 33 questions were fully complied with, from the buyers' standpoint, we honestly believe the foundryman would have to go out of business or raise his prices.

Hoping that this frank and free statement will be of help to all concerned, we submit it.

(Signed) P. E. MONTANUS,
P. G. MARCH.

Collecting Costs of Investigating Unfair Claims.

Murray Shipley, Cincinnati, as chairman of the committee on claims of buyers against manufacturers, recommended that the association adopt as its rule the recommendation of the committee to give prompt attention to any claims made by the buyer and if necessary send a representative to investigate the claims with the understanding that if substantiated the manufacturer would bear the expense involved, and if not the buyer should recompense the manufacturer for his expenditures.

At this juncture it was asked how the manufacturer was going to persuade his buyer that his claim was without foundation, and even in that event how the committee expected to collect, and William Lodge, Cincinnati, in reply, advised that a definite understanding as to the cost of investigation be made before the manufacturer enters into any expense. This recommendation, with the committee's report, was adopted.

Cancellations of Orders.

The question of indiscriminate cancellation of orders, which has been experienced by many machine tool builders of late, came before the convention, and it was declared that there was a necessity for arranging a remedy for the method of selling machine tools on credit. Buyers, it was stated, frequently acquired title to machines before paying for them in full, and it was recommended that the manufacturer make it a rule to reserve title until fully recompensed for his machine. In this connection C. A. Johnson, as chairman of the committee appointed at the previous meeting of the association to devise a uniform contract with the consumer, submitted a report, in which he stated that his committee had corresponded with all of the members of the organization and with other manufacturers to obtain their views on the question. The report submitted was in part as follows:

MR. JOHNSON'S REPORT.

At the last fall meeting of the association, J. B. Doan, George W. Fifield and the speaker were appointed a committee to inquire into the advisability of the members of this association adopting a uniform sales contract form. It was believed by some of the members that an agreement among the manufacturers who deal directly and the machinery dealers, to use a specific sales contract form, would better protect both the manufacturer and the dealer from losses, which, through various causes, are periodically sustained in machinery transactions with the consumers. Practically all the members of the association responded, and, almost without exception, their expressions were favorable to the adoption, if possible, of some uniform contract form. There were some who misunderstood the intent of the letter, in that they considered it as relating to contracts between manufacturers and dealers. Such is not the case. The committee had simply to investigate the question of a sales contract form to be used by the manufacturers who sell directly and machinery dealers in their transactions with the consumer.

Doubtless no one present will question the desirability of so drafting our sales contract forms that we will be protected against losses of accounts and will also be protected from promiscuous cancellations of orders. This granted, it is just a question as to whether or not contracts embodying such provisions as above outlined can be generally used.

RESULTS OF THE CORRESPONDENCE.

In our correspondence several points have been raised in connection with the above mentioned provisions, and we will first discuss the question of retention of title in the seller until the goods are paid for. The writer firmly believes that this would cause practically no trouble; certainly it would cause no trouble if all sales contracts for machinery were made embodying such a provision. In many lines of business it is practically impossible to make purchases without signing contracts in which title is reserved to the seller. It has been the experience of the company with which the writer is connected that only in one case out of many hundred has the question been raised, and then only by a company whose credit was questionable.

Practically all those who purchase machinery do so expecting to make full payment for it, and it would seem that a purchaser would be subjected to no considerable hardship if, through any cause, he failed to make payment the machinery in question was taken possession of by the party from whom it was purchased. He would have had the use of the machine, and even though a large part of the account had been paid the seller would only be entitled to compensation for the use of the machine and the depreciation thereon.

The whole matter really resolves itself into this propo-

sition: Are machinery manufacturers and dealers more anxious concerning the interests of purchasers than they are for their own interests? No concern could afford to be unreasonable as regards its action in case of sales made on the terms proposed, on account of injury to its reputation. As before stated, those concerns which expect to settle their accounts in full will not object to the above provision, and certainly the manufacturer and the dealer should be protected against those whose financial standing is uncertain.

It appears that the advisability of embodying the provisions could not be questioned provided it can be introduced without too much trouble, and this is a question that will require both time and some expense to investigate. The laws of the different States vary considerably as regards conditional sales. In some States the embodiment of such a clause as above outlined in a contract signed by the purchaser is all that is necessary to keep the title in the seller until the machine is paid for; in other States it is necessary to have witnesses; in others the contracts must be recorded, and so on. Therefore, it may be necessary to use different forms for different States, but if all manufacturers and dealers agree to use specific forms, prospective buyers will have to conform to the requirements or else remain without the desired machinery.

NOT A RADICAL STEP.

It should be said here that this is not a radical step as regards business generally, because, as before stated, in many lines of business this provision is being used generally. If it were found to be impossible to make a form of contract satisfactory for all States, it could be made for those States where such provisions would be legal—certainly half a loaf is better than none. But it appears that a way has been discovered whereby those selling machines embodying patented features can, if necessary, regain possession of them by taking proceedings in the United States Court even though the party to whom the goods were originally sold had in turn sold them to another party. A statement to this effect appeared recently in one of the trade journals, although the report may not be authentic.

Concerning a provision against cancellations, this also has been questioned for various reasons. In the past it has been the almost universal custom for the purchaser to cancel orders at will, and the manufacturers or dealers have accepted cancellations as gracefully as possible. It would certainly appear that the manufacturer should have something to say as regards the cancellation of an order when he may have expended up to the time of receiving the cancellation from 5 to 10 per cent. or possibly more of the purchase price.

The purchaser is subjected to no expense in most cases, until he receives the machinery at his plant. On the contrary, the seller is at some expense before he receives the order, and the expense continues until he makes delivery of the machine. No one can question the right of the purchaser to cancel an order if delivery is not made at the promised time, but cancellations on account of temporary business depressions are quite different. Unless profits of machinery manufacturers are greater than generally believed the burden imposed by the necessity of carrying one or more machines would not be much heavier on the purchaser than on the manufacturer, and if the manufacturer is willing to take chances of getting payment he should have something to say as to whether or not shipment should be made. Especially should manufacturers be protected against cancellations from those who take such steps in the belief that they ought to be able to get reduced prices by the time the goods are actually wanted.

ABOUT SPECULATIVE ORDERS.

It is safe to say that there are very few manufacturers of machine tools who would to-day have so large an investment in stock machines had it not been for the fact that many orders were placed by consumers on a speculative basis, knowing that cancellations could be made if desired. The manufacturer, however, considered it necessary for him to make preparations to furnish machines as specified, with the result, as above stated, that many have more stock machines than they would like to carry.

It is not the opinion of the members of the committee that cancellations can be absolutely prevented, but united action on the part of the manufacturers and dealers will undoubtedly improve existing conditions. Neither the manufacturer nor the dealer could afford to be unreasonable, but it certainly seems that the man who has his money invested should at least be consulted.

Not only do we believe that the general use of a sales contract form, embodying the above provisions and other usual and reasonable requirements, would benefit machinery manufacturers and dealers, but it would also have a beneficial effect on business generally.

The Custom in the Automobile Trade.

E. P. Bullard, Bridgeport, Conn., called the attention of the association to the practice of many automobile manufacturers who require a 20 per cent. discount with orders in order to avoid the possibility of cancellations. No definite action was taken on that recommendation, and

the report of the committee was accepted and the committee was directed to act jointly with a committee from the Dealers' Association to devise and, if possible, adopt a uniform contract with the consumer containing a non-cancellation clause and stipulating that the manufacturer retain title until fully paid for his product. The committee was given power to obtain legal advice on the matter. One member recommended that a campaign of education be begun, and the manufacturers print a non-cancellation clause on their stationery.

About Freight Charges.

The Committee on Freight Charges, which had been appointed at a previous meeting of the association, reported through R. K. Le Blond, Cincinnati, as chairman, that it had been unable to accomplish any definite results in securing a remedy for excess carload shipment charges exacted by the railroads. Efforts had been made, he stated, with various railroad associations, with official classification committees and with the Interstate Commerce Committee, with a view to securing some concessions from the railroad companies on this point.

Secretary Montanus gave it as his opinion that it would be well for the organization to commence a general agitation in the matter, and the committee was instructed to continue its work.

Industrial Education.

An interesting address was made by J. H. Cone, assistant secretary of the National Metal Trades Association, who was in charge of the educational work of that organization, outlining the co-operative training course as practiced at the University of Cincinnati and in the shops of that city. The question of educating apprentices took up a great deal of time at the last convention of the National Trades Association held in New York and reported in the issues of *The Iron Age* of March 26 and April 2.

Mr. Cone stated there was an imperative need of developing public sentiment toward a logical solution of the labor problem, and he spoke of the experience of associations and the cost of strikes to the industrial world. He reviewed the success of his association and similar organizations in preventing the passage of unfair legislation and pleaded for co-operation in the line of educational work. The speaker referred to the number of institutes that were meeting with success in industrial educational work by combining the school work with the practical experience in the shop as originated by Prof. Herman Schneider, Dean of the College of Engineering of the University of Cincinnati.

To Arbitrate Disagreements.

Previous to the conclusion of the business session the Committee on Resolutions offered suggestions for the arbitration of minor differences in the organization arising from patent disputes and the like in the shape of a recommendation to the effect that such disputes be referred to an arbitration committee composed of one member chosen by each of the interested parties, and the third selected by those already chosen. The recommendation was adopted.

The members were particularly impressed with the manner in which President Fred L. Eberhardt conducted the meetings, the sessions being noticeable for the fact that a large amount of business was transacted in a short space of time, and as a result, just before the adjournment, a rising vote of thanks was offered to the president.

While reference was made to Heyl & Patterson, Pittsburgh, Pa., in connection with a portion of the equipment of the gas producer plant of the Ensley steel works of the Tennessee Coal, Iron & Railroad Company, described in *The Iron Age* of May 21, 1908, the extent of this firm's installation was not indicated in the way intended. Heyl & Patterson furnished the entire coal and ash handling and storing apparatus and the coal distributing system serving the gas producers.

For the second time within 24 hours, the House of Representatives, May 23, following a discussion of two hours, rejected the mail subsidy provision for ocean steamships. This disposes of the matter for the present session.

The Customs Administrative Act Amended.

WASHINGTON, D. C., May 26, 1908.—Congress the past week has amended the customs administrative act in certain important particulars by the enactment of a law which passed the two houses in diverse forms but was finally harmonized in Conference Committee. It provides important changes in Sections 14 and 15 of the act which prescribe the method of procedure before the Board of General Appraisers and the courts upon appeals from rulings of the Board.

Changes in Section Fourteen.

Section 14 of the administrative act as modified by the amendatory bill reads as follows, the words stricken out of the existing law being inclosed in brackets and the new matter printed in italics:

Sec. 14. That the decision of the collector as to the rate and amount of duties chargeable upon imported merchandise, including all dutiable costs and charges, and as to all fees and exactions of whatever character (except duties on tonnage), shall be final and conclusive against all persons interested therein, unless the owner, importer, consignee or agent of such merchandise, or the person paying such fees, charges and exactions other than duties shall, within [ten] fifteen days after, but not before such ascertainment and liquidation of duties, as well in cases of merchandise entered in bond as for consumption, or within [ten] fifteen days after the payment of such fees, charges and exactions, if dissatisfied with such decision, give notice in writing to the collector, setting forth therein distinctly and specifically, and in respect to each entry or payment, the reasons for his objections thereto, and if the merchandise is entered for consumption shall pay the full amount of the duties and charges ascertained to be due thereon. Upon such notice and payment the collector shall transmit the invoice and all the papers and exhibits connected therewith to the board of three general appraisers, which shall be on duty at the port of New York, or to a board of three general appraisers, who may be designated by the Secretary of the Treasury for such duty at that port or at any other port, which board shall examine and decide the case thus submitted, and their decision, or that of a majority of them, shall be final and conclusive upon all persons interested therein, and the record shall be transmitted to the proper collector or person acting as such, who shall liquidate the entry accordingly, except in cases where an application shall be filed in the Circuit court within the time and in the manner provided for in Section 15 of this act: *Provided, however, That the board of three general appraisers, or a majority of them, who decided the case may, upon motion of either party, within 30 days next after their decision, and not afterward, grant a rehearing of said case when, in their opinion, the ends of justice may require it.*

The general Board of nine General Appraisers shall have power to establish from time to time such reasonable rules of practice, not inconsistent with the law, as may be deemed necessary, for the conduct of their proceedings and of the proceedings of the said board of three general appraisers, and to assign or reassign any case to any of such boards of three at any time before promulgation of decision, in order to secure uniformity of decision.

Experience has demonstrated that the ten days' period does not afford a sufficient time for importers to consult their attorneys and brokers in reference to pending issues and increases the number of frivolous protests. The proviso at the end of the section clothes the Board with power to grant a rehearing to correct such errors as the Board may have committed, without requiring the importers or the Government to go through the process of appealing to the courts. Under the present procedure it also sometimes happens that substantially identical issues are diversely decided by two sub-boards and as the general board cannot reassign such cases much confusion results.

Section Fifteen Modified.

The amendatory act changes the form of Section 15 of the customs administrative law so comprehensively as to make a textual comparison difficult. The amended section follows the existing law as to the first paragraph and presents new matter thereafter. The amended text will read as follows:

Sec. 15. That if the owner, importer, consignee or agent of any imported merchandise, or the collector, or the Secretary of the Treasury, shall be dissatisfied with the decision of the board of general appraisers as provided for in Section 14 of this act, as to the construction of the law and the facts respecting the classification of such merchandise and the rate of duty imposed thereon under such classification, they, or either of them, may, within 30 days next after such decision, if a rehearing has not been previously granted, or within 30 days next after the deci-

sion of the board of general appraisers after such rehearing, and not afterward, apply to the Circuit Court of the United States within the district in which the matter arises for a review of the questions of law and fact involved in such decision. Such application shall be made by filing in the office of the clerk of said Circuit Court a concise statement of the errors of law and fact complained of, and a copy of such statement shall be served on the collector, or on the importer, owner, consignee or agents, as the case may be. Thereupon the court shall order the board of general appraisers to return to said Circuit Court the record and the evidence taken by them, together with the certified statement of the facts involved in the case, and their decision thereon; and all competent evidence taken by and before said board of general appraisers shall be evidence before said Circuit Court.

The parties litigant shall hereafter be required to introduce all of their evidence before the said board of general appraisers prior to its decision of the case. The return made by the board of general appraisers in pursuance of the order of the Circuit Court shall constitute the record upon which said Circuit Court shall give priority to and proceed to hear and determine the questions of law and fact involved in such decision respecting the classification of such merchandise and the rate of duty imposed thereon under such classification: Provided, That the said Circuit Court is further vested with the power to remand any case pending before it on appeal from a decision of the board of general appraisers when, in its opinion, such proceeding is just and proper, but this shall not be ordered except upon motion duly made and after notice to the opposite party. When such order is made the case shall then be remanded to the board of general appraisers whose decision has been appealed from, and the said board shall hear such further testimony as shall be introduced by either party, and shall return to the Circuit Court the additional evidence so taken, together with a further certified statement of facts as supplemented or modified by such additional testimony, and their decisions upon the whole case as thus supplemented or modified, which said additional return shall be added to and become part of the record upon which the case shall be heard and determined by the Circuit Court.

The decision of such Circuit Court shall be final, and the proper collector, or person acting as such, shall liquidate the entry accordingly, unless such court shall be of the opinion that the question involved is of such importance as to require a review of such decision by the Circuit Court of Appeals of the United States within the circuit in which the matter arises, in which case said circuit or the judge making the decision may, within 30 days thereafter, allow an appeal to said Circuit Court of Appeals; but an appeal shall be allowed on the part of the United States whenever the Attorney-General shall apply for it within 30 days after the rendition of such decision. On such original application and on any such appeal security for damages and costs shall be given as in the case of other appeals in cases in which the United States is a party. Said Circuit Court of Appeals shall have jurisdiction and power to review such decision, and shall give priority to such cases, and may affirm, modify or reverse such decision of such Circuit Court and remand the case with such orders as may seem to it proper in the premises, which shall be executed accordingly.

The decision of such Circuit Court of Appeals may be reviewed by the Supreme Court of the United States in any of the ways provided in cases arising under the revenue laws by the act approved March 3, 1891, entitled "An act to establish circuit courts of appeals, and to define and regulate in certain cases the jurisdiction of the courts of the United States, and for other purposes."

All final judgments, when in favor of the importer, shall be satisfied and paid by the Secretary of the Treasury from the permanent indefinite appropriation provided for in Section 24 of this act.

For the purposes of this section the circuit courts of the United States shall be deemed always open, and said circuit courts, respectively, may establish, and from time to time alter, rules and regulations not inconsistent herewith for the procedure in such cases as they shall deem proper.

Where cases arise at ports within any jurisdiction having no Circuit Court, applications for review of the decisions of the board of general appraisers provided for in Section 15 of this act shall be filed with the clerks of the courts having cognizance of the same classes of cases as circuit courts, and such cases shall be heard and determined by such courts, with the same powers and in like manner as herein provided for the hearing and determination of such cases in circuit courts, and such decisions shall be subject to review in the manner provided by law.

Significance of Changes.

The modifications embraced in the above section are of much importance. The first significant change requires litigants to introduce all of their evidence before the Board of General Appraisers prior to its decision of the case. Heretofore importers frequently presented only sufficient evidence before the Board to develop the Government's case and then proceeded to make an entirely new showing before the circuit court. It is further provided that the circuit court may remand any case pending before it on appeal from the decision of the Board of General Appraisers, whereupon the Board shall hear such further testimony as shall be introduced by either party

and subsequently return to the circuit court the additional evidence so taken together with a decision upon the whole case thus supplemented. This change, in connection with the power granted to the Board to give re-hearings, is counted upon to relieve the circuit court of much unnecessary labor and to expedite appeals as well as to reduce the volume of protests. The final paragraph of Section 15 as modified by the amendatory act is intended to cover cases arising in Porto Rico or Hawaii where there are no United States circuit courts.

The amendatory act also adds a new section to the customs administrative law as follows:

Sec. 31. That all of the general appraisers of merchandise heretofore or hereafter appointed under the authority of said act shall hold their office during good behavior, but may, after due hearing, be removed by the President for the following causes, and no other: Neglect of duty, malfeasance in office, or inefficiency.

That hereafter the salary of each of the general appraisers of merchandise shall be at the rate of \$9000 per annum.

That the said boards of general appraisers and the members thereof shall have and possess all the powers of a circuit court of the United States in preserving order, compelling the attendance of witnesses and the production of evidence, and in punishing for contempt.

Other important changes had been greatly desired by the Treasury Department, the Department of State and by influential importing interests, but Congress decided not to consider them until the comprehensive revision of the Dingley tariff act now in prospect has been actually undertaken.

W. L. C.

The Indiana Express Case.

A decree has been entered in the Federal Court at Indianapolis, Ind., enjoining until final hearing of the case, or until further orders, the members of the Indiana Railroad Commission from attempting to enforce the reduced rates provided in their finding against six express companies. The commission cut the rates 10 to 12 per cent., after an exhaustive investigation lasting several months, of the conditions existing in the State as to the business and rates of express companies. The testimony before the commission is contained in more than 1300 typewritten pages, and the commission's finding takes 52 typewritten pages. Its inquiry and its decision have attracted attention in other States that have sent representatives to Indianapolis to get information concerning the express companies.

The commission had found that express company profits are unduly large, that the companies have little or no tangible property, that profits properly chargeable as railroad earnings are diverted to express companies, that there is practically no competition except that of the Government, and that rates have been practically unchanged for years. To show how the express companies have been able to pay immense dividends and set aside unusually large surplus funds, the commission gives information and reports that indicate that these companies are controlled by railroads and can monopolize the business on certain kinds of traffic not desired by the railroads and raise the prices to suit themselves; that the companies agree on rates and do not have the many great expenses borne by railroad companies. The inquiry demonstrated that the profits of express business in Indiana are 16 to 75 per cent., the commission says.

The six express companies—the Pacific, Wells-Fargo, Adams, American, National and United States—in seeking the injunction contend that the proposed reduction in rates, as set forth in the finding, would prove confiscatory and tend to take the property of the complainants without due process of law, in violation of the Constitution of the United States.

The Pennsylvania Railroad has just completed and put in operation a new double track low grade line from Pittsburgh to Trenton, N. J., and promises to extend it to the seashore soon. There is only a 24-mile climb up the west side of the Allegheny Mountains. On reaching Gallitzin at the crest the new line shoots off to Petersburg on the main line and parallels the latter to Harrisburg, Pa., running thence by a new and shorter route to Trenton.

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sion of the board of general appraisers after such rehearing, and not afterward, apply to the Circuit Court of the United States within the district in which the matter arises for a review of the questions of law and fact involved in such decision. Such application shall be made by filing in the office of the clerk of said Circuit Court a concise statement of the errors of law and fact complained of, and a copy of such statement shall be served on the collector, or on the importer, owner, consignee or agents, as the case may be. Thereupon the court shall order the board of general appraisers to return to said Circuit Court the record and the evidence taken by them, together with the certified statement of the facts involved in the case, and their decision thereon; and all competent evidence taken by and before said board of general appraisers shall be evidence before said Circuit Court.

The parties litigant shall hereafter be required to introduce all of their evidence before the said board of general appraisers prior to its decision of the case. The return made by the board of general appraisers in pursuance of the order of the Circuit Court shall constitute the record upon which said Circuit Court shall give priority to and proceed to hear and determine the questions of law and fact involved in such decision respecting the classification of such merchandise and the rate of duty imposed thereon under such classification: Provided, That the said Circuit Court is further vested with the power to remand any case pending before it on appeal from a decision of the board of general appraisers when, in its opinion, such proceeding is just and proper, but this shall not be ordered except upon motion duly made and after notice to the opposite party. When such order is made the case shall then be remanded to the board of general appraisers whose decision has been appealed from, and the said board shall hear such further testimony as shall be introduced by either party, and shall return to the Circuit Court the additional evidence so taken, together with a further certified statement of facts as supplemented or modified by such additional testimony, and their decisions upon the whole case as thus supplemented or modified, which said additional return shall be added to and become part of the record upon which the case shall be heard and determined by the Circuit Court.

The decision of such Circuit Court shall be final, and the proper collector, or person acting as such, shall liquidate the entry accordingly, unless such court shall be of the opinion that the question involved is of such importance as to require a review of such decision by the Circuit Court of Appeals of the United States within the circuit in which the matter arises, in which case said circuit or the judge making the decision may, within 30 days thereafter, allow an appeal to said Circuit Court of Appeals; but an appeal shall be allowed on the part of the United States whenever the Attorney-General shall apply for it within 30 days after the rendition of such decision. On such original application and on any such appeal security for damages and costs shall be given as in the case of other appeals in cases in which the United States is a party. Said Circuit Court of Appeals shall have jurisdiction and power to review such decision, and shall give priority to such cases, and may affirm, modify or reverse such decision of such Circuit Court and remand the case with such orders as may seem to it proper in the premises, which shall be executed accordingly.

The decision of such Circuit Court of Appeals may be reviewed by the Supreme Court of the United States in any of the ways provided in cases arising under the revenue laws by the act approved March 3, 1891, entitled "An act to establish circuit courts of appeals, and to define and regulate in certain cases the jurisdiction of the courts of the United States, and for other purposes."

All final judgments, when in favor of the importer, shall be satisfied and paid by the Secretary of the Treasury from the permanent indefinite appropriation provided for in Section 24 of this act.

For the purposes of this section the circuit courts of the United States shall be deemed always open, and said circuit courts, respectively, may establish, and from time to time alter, rules and regulations not inconsistent herewith for the procedure in such cases as they shall deem proper.

Where cases arise at ports within any jurisdiction having no Circuit Court, applications for review of the decisions of the board of general appraisers provided for in Section 15 of this act shall be filed with the clerks of the courts having cognizance of the same classes of cases as circuit courts, and such cases shall be heard and determined by such courts, with the same powers and in like manner as herein provided for the hearing and determination of such cases in circuit courts, and such decisions shall be subject to review in the manner provided by law.

Significance of Changes.

The modifications embraced in the above section are of much importance. The first significant change requires litigants to introduce all of their evidence before the Board of General Appraisers prior to its decision of the case. Heretofore importers frequently presented only sufficient evidence before the Board to develop the Government's case and then proceeded to make an entirely new showing before the circuit court. It is further provided that the circuit court may remand any case pending before it on appeal from the decision of the Board of General Appraisers, whereupon the Board shall hear such further testimony as shall be introduced by either party

and subsequently return to the circuit court the additional evidence so taken together with a decision upon the whole case thus supplemented. This change, in connection with the power granted to the Board to give re-hearings, is counted upon to relieve the circuit court of much unnecessary labor and to expedite appeals as well as to reduce the volume of protests. The final paragraph of Section 15 as modified by the amendatory act is intended to cover cases arising in Porto Rico or Hawaii where there are no United States circuit courts.

The amendatory act also adds a new section to the customs administrative law as follows:

Sec. 31. That all of the general appraisers of merchandise heretofore or hereafter appointed under the authority of said act shall hold their office during good behavior, but may, after due hearing, be removed by the President for the following causes, and no other: Neglect of duty, malfeasance in office, or inefficiency.

That hereafter the salary of each of the general appraisers of merchandise shall be at the rate of \$9000 per annum.

That the said boards of general appraisers and the members thereof shall have and possess all the powers of a circuit court of the United States in preserving order, compelling the attendance of witnesses and the production of evidence, and in punishing for contempt.

Other important changes had been greatly desired by the Treasury Department, the Department of State and by influential importing interests, but Congress decided not to consider them until the comprehensive revision of the Dingley tariff act now in prospect has been actually undertaken.

W. L. C.

The Indiana Express Case.

A decree has been entered in the Federal Court at Indianapolis, Ind., enjoining until final hearing of the case, or until further orders, the members of the Indiana Railroad Commission from attempting to enforce the reduced rates provided in their finding against six express companies. The commission cut the rates 10 to 12 per cent., after an exhaustive investigation lasting several months, of the conditions existing in the State as to the business and rates of express companies. The testimony before the commission is contained in more than 1300 typewritten pages, and the commission's finding takes 52 typewritten pages. Its inquiry and its decision have attracted attention in other States that have sent representatives to Indianapolis to get information concerning the express companies.

The commission had found that express company profits are unduly large, that the companies have little or no tangible property, that profits properly chargeable as railroad earnings are diverted to express companies, that there is practically no competition except that of the Government, and that rates have been practically unchanged for years. To show how the express companies have been able to pay immense dividends and set aside unusually large surplus funds, the commission gives information and reports that indicate that these companies are controlled by railroads and can monopolize the business on certain kinds of traffic not desired by the railroads and raise the prices to suit themselves; that the companies agree on rates and do not have the many great expenses borne by railroad companies. The inquiry demonstrated that the profits of express business in Indiana are 16 to 75 per cent., the commission says.

The six express companies—the Pacific, Wells-Fargo, Adams, American, National and United States—in seeking the injunction contend that the proposed reduction in rates, as set forth in the finding, would prove confiscatory and tend to take the property of the complainants without due process of law, in violation of the Constitution of the United States.

The Pennsylvania Railroad has just completed and put in operation a new double track low grade line from Pittsburgh to Trenton, N. J., and promises to extend it to the seashore soon. There is only a 24-mile climb up the west side of the Allegheny Mountains. On reaching Gallitzin at the crest the new line shoots off to Petersburg on the main line and parallels the latter to Harrisburg, Pa., running thence by a new and shorter route to Trenton.

OBITUARY.

W. D. EWART.

William Dana Ewart died at Rome, Italy, May 3, aged 56 years. His death will be noted with more than ordinary regret by those whom his genial disposition had made his friends, and by the many others to whom his most prominent invention has made his name familiar. He was born in Ohio, and at a comparatively early age gave evidence of an inventive mind and rare mechanical ability.

Mr. Ewart was the inventor of the malleable iron detachable drive chain, first known under his name, and in later years as link-belt, which has formed an important part of agricultural and other duplicate machinery, and has, to possibly a greater extent than any other single invention, helped the wonderful progress in the development of elevating and conveying machinery during the past 30 years. This drive chain has been continuously manufactured by the Ewart Mfg. Company and exploited by the Link-Belt Machinery and Link-Belt Engineering



W. D. EWART.

companies till in 1906 all three companies were consolidated into the Link-Belt Company, a corporation in which he was largely interested and whose fortunes are still principally directed by his former associates. Mr. Ewart, whose abilities brought their proper reward, was not only an inventor but a man of executive capacity, possessing a rare gift for harmonizing differences and securing co-operation. His health becoming impaired, he retired in his early prime from the activities of business and sought renewal of physical strength under more favorable climatic conditions abroad.

HENRY GAY, Winsted, Conn., for many years actively interested in the industrial life of that town, died May 17, aged 74 years. He was a member of the banking firm of Holmes & Gay, a director of the William L. Gilbert Clock Company and Morgan Silver Plate Company, and was formerly president of the Winsted Edge Tool Works and a director of the T. C. Richards Hardware Company. He was a native of Salisbury, Conn.

WALTER HATFIELD, vice-president and treasurer of Hughes & Patterson, Inc., owners of the long idle Philadelphia Iron & Tin Plate Works, died suddenly at the Hotel Stenton, Philadelphia, May 18, aged about 50 years. He was unmarried.

B. H. THWAITE, a London, Eng., engineer, who had paid several visits to the United States, died in London recently, aged 53 years. He contributed the first article on the use of blast furnace gas in gas engines, and had devoted considerable attention to the continuous process

of open-hearth steel production, to blast furnace practice, especially pyrometry, and to the use of the electric current in melting steel. He contributed several papers to the proceedings of the Iron and Steel Institute, the last, which was presented at the Vienna meeting in 1907, dealing with the electric distribution of power from blast furnaces.

WM. H. MARSH, founder and president of the Standard Water Meter Company, Brooklyn, N. Y., died May 20, of hydrophobia, aged 58 years. He was born in Ontario, Canada, and had been a resident of this country 25 years. He leaves a widow, three sons and two daughters. His eldest son has succeeded him as president of the company.

GEORGE GARRETT, a partner in the Waverley Iron & Steel Company, Coatbridge, Eng., died May 11, aged 62 years. He was a brother of the late William Garrett, of Cleveland, Ohio.

Lessons from a Fire in a Reinforced Concrete Factory Building.

The fire at the Dayton Motor Car Company's plant, Dayton, Ohio, some weeks ago, gave an opportunity to test the efficiency of reinforced concrete as a fireproof building material. The main portion of the factory consists of a mill-construction building of five stories and basement, adjoined by a reinforced concrete building, U-shaped in plan and six stories and basement in height. The two buildings were practically made a continuous unit, as the walls of the brick building served as the boundary of the concrete building on the open side of the U, communication being afforded between the two buildings by doors on each floor. When the fire department arrived, the fire had extended over the entire fourth floor of the concrete building. The contents of this floor were destroyed, but the building escaped with slight damage. Through the absence of fire doors and the inability of the department to withstand the intense heat and smoke, the fire was communicated through an opening to the adjoining five-story brick building and was confined to the two upper floors. It was in this building that the greatest loss was sustained.

The report of the chief of the Dayton Fire Department brings out some suggestions as to proper reinforced concrete construction, from which the following is taken:

"The new building, being of concrete construction, aided us greatly in preventing the fire from wiping out the entire plant, as we were able to concentrate practically our entire force on the old building, it requiring but a small force to subdue the fire in the concrete building. In my opinion, there are a few points that the results of this fire have proved, namely:

"First: That the reinforcing steel should be covered with at least 2 in. of concrete, because the fire, having penetrated the lower inch of concrete, would have affected the strength of the structure had it not been for the rigidly attached diagonals.

"Second: That the finished cement surface should be put on when the floor is being laid, thereby forming a solid mass; because the finished surface was destroyed wherever the heat was intense, the slab underneath being uninjured.

"Third: We were hampered greatly in handling our ladders and several of our firemen had a very narrow escape from being injured or possibly killed by falling sashweights, and we were compelled to force into the building all window frames that had not already fallen before we could use our ladders to advantage. I would suggest that in the construction of a building an iron pipe be imbedded in the concrete for the weights to fall into, in case the window frames are destroyed by fire. If this plan were adopted in the construction of a building it would enable the firemen to reach the fire without endangering their lives and would assist greatly in reducing the fire loss."

The Pittsburgh shops of the McClintic-Marshall Construction Company, builder of steel bridges, buildings, &c., is running on single turn five days per week at present.

NEWS OF THE WORKS.

Iron and Steel.

The Lorain Steel Company is completing the principal part of a new building at Johnstown, Pa., which will be devoted to the manufacture of T rail specialties, and expects to occupy it by June 1. The rest of the structure will require three or four months to complete.

No. 2 City Furnace of the Sloss-Sheffield Steel & Iron Company, at Birmingham, Ala., has been put in blast. Lady Ensley Furnace of the same company, at Sheffield, Ala., has been blown out for repairs.

The John A. Roebling's Sons Company, Trenton, N. J., has taken out a permit for the new buildings to replace those which were burned some time ago.

The receivers of the New York State Steel Company, Buffalo, N. Y., reopened the rolling mill May 25 and will turn out 300 tons daily. The openhearth furnace has been in operation for about a month. An order of the court has been obtained for the payment of a dividend of 25 per cent. to the company's creditors as soon as sufficient assets have been converted into cash for that purpose.

The Ohio works of the Carnegie Steel Company at Youngstown, Ohio, is on practically full this week. At the Union Works of the company in Youngstown, five mills at the upper and four mills at the lower plant are running.

The Bessemer plant of the Republic Iron & Steel Company at Youngstown, Ohio, is in operation this week with fair specifications ahead. The 10-in. continuous, 18-in. continuous, 7-in. continuous, No. 3 bar mill, No. 4 puddle mill and spike factory are on at the Brown-Bonnell Works. At the Valley plant, all mills resumed Monday except the 18-in.

Five of the six hot mills in the plant of the Youngstown Iron & Steel Roofing Company, Youngstown, Ohio, are in operation this week.

General Machinery.

The Angola Engine & Foundry Company, Angola, Ind., is contemplating the removal of its plant from that city to some point affording better shipping facilities. To this end the company is now in correspondence with representatives of commercial bodies in different cities, but as yet no location has been selected.

The American Concentrator Company, manufacturer of mining machinery, Joplin, Mo., intends to move its plant to Basic City, Va., where a location has been selected. The plant at Joplin, Mo., will be discontinued.

The Chamberlain Machine Works, Waterloo, Iowa, which makes a line of cream separator accessories, is preparing to erect a new three story factory.

The Union Pacific Railroad which began the erection of large shops at Omaha, Neb., nearly two years ago, and on which work was stopped the latter part of last year, has decided to proceed with the completion of the plant.

W. S. Bruce & Co., Memphis, Tenn., will require some machinery for the new garage they intend to erect, but have not yet decided just what machinery will be installed.

The Cannery Machinery Company has been incorporated at Buffalo, N. Y., with a capital of \$75,000, to manufacture machinery for canning factories. The company will not establish a factory of its own at present, having arranged with the Noye Mfg. Company, Buffalo, to manufacture for it under contract. Wm. B. Phinney will be president, and Roger C. Adams, secretary and treasurer.

The Pittsburgh office of the Jeffreys Mfg. Company, Columbus, Ohio, has closed a contract for four $6\frac{1}{2}$ ton electric gathering locomotives for the Ellsworth coal mines of the Lackawanna Steel Company, and another contract for an electric locomotive for the National Mining Company, an identified interest of the United States Steel Corporation.

H. J. Koontz, Bessemer Building, Pittsburgh, Pa., dealer in new and second hand machinery, has recently made sales as follows: One 30 kw. generator and engine, direct connected; one 12 x 12 x 14 in. air compressor; one pressure tank; one 6 x 4 x 6 in. pump; one 45 kw. Westinghouse generator, 125 volts; one 10 kw. 250 volt generator; one 2 hp. Lundell 125 volt motor; eleven 250 volt motors from 5 to 20 hp., direct current; five motors, alternating current, 2-phase, 60 cycle from 5 to 50 hp.; one 20-ton York refrigerating machine; one $2\frac{1}{2}$ ton ice plant complete; one 36 in. throat Cleveland punch and shear; three 6,000 gal. oil tanks; six 50 ft. span roof trusses; one 72 x 18 ft. riveted boiler; one 7 x 5 x 7 in. pump for Philadelphia delivery; one 72 x 18 ft. boiler for Coalport, Pa. Mr. Koontz also reports having a number of inquiries for electrical machinery and machine tools.

Foundries.

The Nortmann & Duffke Company, Milwaukee, Wis., founder, has purchased property for an office building about 30 x 50 ft., to be erected adjoining its plant.

The Southern Wisconsin Foundry Company has been incor-

porated at Madison, Wis., with a capital stock of \$25,000, by Henry A. Kanbe, Herman M. Vance and Samuel G. Scanlon.

Power Plant Equipment.

The installation of a pumping plant will be included in an irrigation project about to be undertaken by the Bridgeport Land Company, Bridgeport, Wash., which has been incorporated with a capital of \$100,000. Water for irrigation will be taken from the Columbia River and will be distributed through a seven mile ditch. Work on ditches and canals will be begun in the fall. J. B. Valentine is president and general manager; C. M. Phoenix, vice-president; C. W. Ingham, secretary and treasurer.

The City of McKinney, Texas, will issue bonds in the sum of \$26,000 for the extension of the water works, electric light system and purchase and improvement of a city park. Of this sum \$16,000 will be devoted to the light and water system.

Fred. M. Sadler, Ellsworth, Minn., has secured a franchise to construct and operate an electric light plant in that town.

The Winchester Electric Company, Winchester, Ill., has been recently organized to operate a light and power plant. The new company has a capital stock of \$10,000 and has issued bonds for an additional \$10,000, all of which, we are advised, has been taken and paid for. Among those interested in the new company are William Milhouse, C. H. Condit and S. Hainsfurther.

The Hewes & Phillips Iron Works, Newark, N. J., has received an order from the Potomac Mills for a 21 and 44 x 54 in. heavy duty tangye cross compound engine; Newark Evening News, two 16 x 30 in. engines of improved tangye type, equipped with the new Franklin valve gear, direct connected to Crocker-Wheeler generators. This is the fourth order received from the latter company.

The Great Northern Railroad, St. Paul, Minn., recently placed contracts covering an Allis-Chalmers 22 and 44 x 42 in. heavy duty cross compound Reynolds-Corliss engine, driving a 750 kw. Allis-Chalmers engine type alternator, as well as an exciter set and lighting transformers. The new equipment is intended for installation at Superior, Wis., where the power will be used for operating grain elevator machinery.

The Titusville Iron Company, Titusville, Pa., has let contract for the erection of the new warehouse and power plant, 180 ft. sq., in which will be installed modern equipment.

Bridges and Buildings.

The Buckeye Steel Casting Company, Columbus, Ohio, has placed a contract with the Mount Vernon Bridge Company, Mount Vernon, for the erection of the producer gas building at its plant, and it will place a contract very soon for the erection of a pattern shop.

Fires.

The plant of the Sweet Steel Company, Williamsport, Pa., was damaged \$20,000 by fire May 24.

The pipe shop of the Dominion Iron & Steel Company at Sydney, N. S., was burned May 19, the loss being about \$10,000.

Hardware.

The Rock Island Mfg. Company, Rock Island, Ill., is a new company recently formed for the manufacture of fireless cooking chests, cabinets, and other specialties. The company has commenced operations in a moderate way, and it is expected that the present firm, consisting of C. S. McDaniel and Harry Wullenwaber, will be incorporated in the near future.

The Hardware Mfg. Company, Milwaukee, Wis., incorporated with a capital of \$5,000, has been organized to manufacture the Brown shade adjuster, an appliance recently invented. Other hardware specialties will later on be added to the line, which for the present, however, will be confined to the manufacture of the new shade adjuster. The president and general manager of the company is Jas. R. Petley, who is also treasurer and purchasing agent of the National Brake & Electric Company.

The Birmingham Sash Weight Company, Birmingham, Ala., which was recently incorporated, will establish a plant in East Birmingham to manufacture cast iron sash weights. M. L. Falk is president of the company, and R. M. Long vice-president and superintendent.

The Southern Skein & Foundry Company, Chattanooga, Tenn., recently began the operation of its plant with a good sized force. In addition to Skeins, the company is prepared to furnish the trade with Blacksmith's tools, sad irons, anvils, jack screws, etc.

The Crescent Forge & Shovel Company, Havana, Ill., has purchased the goodwill, patents, patterns, stock, material, etc., of the Weyburn Mfg. Company, Rockford, Ill., manufacturer of steel shapes. All are being moved to Havana, where additions to the plant are being built to accommodate the growing business. The officers of the company are: President, O. B. Thorp; vice-president, W. J. Stowe; treasurer, C. P. King; secretary, J. W. Barnhisel.

At a meeting of the stockholders and directors of the E. H. Bardes Range & Foundry Company, Cincinnati, recently incorporated for \$60,000, with a paid up capital of \$28,000, the following officers were elected: E. H. Bardes, president; Charles H. Resor, first vice-president; L. E. Denning, second

vice-president; William Krummel, treasurer, and F. S. Krug, secretary. The new company has remodeled and refurnished the three story plant formerly occupied by the William Resor Company at 2619-2621 Colerain avenue, and will manufacture the best features of both the Resor and Bardes types of stoves. Forty-three molders are now employed, and the company is planning to enlarge and improve the plant, beginning with a new foundry if the necessary adjoining property can be obtained. E. H. Bardes, president, was 24 years with the Kruckemeyer Company, and Charles H. Resor, first vice-president, grew up in the old Resor plant, putting 34 years of his time there.

The Henkel Mfg. Company has completed and equipped a new factory at Canal Dover, Ohio. The building consists of 3 stories and basement, 40 x 70 ft., and is well lighted throughout.

The Theo J. Ely Mfg. Company, Girard, Pa., manufacturer of hardware specialties, has been incorporated with a capital of \$75,000, fully paid in. The officers are: Theo. J. Ely, president; M. E. Ellis, treasurer, and Theo. B. Ely, vice-president and secretary. The company contemplates considerable additions to its factory and will also increase its line of hardware and woodenware specialties.

The Swift-Waters Company, Berlin, Conn., has been incorporated under Connecticut laws to manufacture hardware. H. A. Twardoks is the president, A. F. Johnson treasurer and Charles Meng secretary. The capital stock is \$25,000. The company will manufacture belt awls, ice picks, screwdrivers, wood chisels, tack fullers and auto repair kits.

Miscellaneous.

J. H. Wagenhorst & Co., Youngstown, Ohio, report that there has been no letup in their sales of automatic electric blue printing machines. Recent sales have been as follows: Haskell-Barker Car Company, Michigan City, Ind.; Pittsburgh Railways Company, Pittsburgh, Pa.; Chicago Railway Equipment Company, Chicago, Ill.; City of Minneapolis, Minn.; H. G. Ferree, Memphis, Tenn.; Bailey & Fuller, Peoria, Ill.; Eller Mfg. Company, Canton, Ohio; United States Government, Washington, D. C.; Cleveland Cliffs Iron Company, Ishpeming, Mich.; Gulf Pipe Line Company, Tulsa, Okla.; A. S. Gilman Printing Company, Cleveland, Ohio; Tuttle & Pike, Kansas City, Mo.; Alexander Blair, Macon, Ga.; Duluth Street Railway Company, Duluth, Minn.; American Optical Company, Southbridge, Mass.; United States Arsenal, Watertown, Mass.; Armour & Co., Chicago, Ill., and Omaha Engineering & Blue Print Company, Omaha, Neb.

Practically the entire plant of the Westinghouse Air Brake Company at Wilmerding, Pa., has shut down in all departments to remain idle until Monday, June 8.

Charles P. Carrothers and John J. Heiser of Denver, Col., who are owners of a patented process for the manufacture of a composition roofing material, have been in negotiation with the Industrial Bureau of Cincinnati, Ohio, with the view of locating a plant for the manufacture of their goods. Cincinnati is an advantageous point because of the close proximity of the southern cotton oil products which enter largely into the manufacture of the material.

The Arthur Koppel Company, Pittsburgh, manufacturer of industrial and portable railways, is erecting an extension to its plant at Koppel, Pa., which will be devoted to the manufacture of portable tracks of special design. The addition is being built with concrete base and corrugated siding over steel frame. The rapid increase of the portable track trade of the company has made this addition to its plant necessary.

The Ritchie Corrugated Culvert Company, Oskaloosa, Iowa, maker of patent corrugated metal culverts, is preparing to move its plant to Ottumwa, Iowa, where it expects to be located about August 1.

It has been decided by the Tri-City Railway & Light Company, Moline, Ill., to overhaul and renovate the gas plant located at the foot of Fourth street in Moline with a view to increasing its efficiency.

The National Cameraphone Company, 423 Water street, Bridgeport, Conn., is to move its factory to larger quarters at Eleventh avenue and Forty-third street, New York. New machinery has been purchased, and the work of manufacturing on a large scale will begin as soon as possible. The company manufactures a combination graphophone and moving picture machine.

The receiver of the Neale & Levy Shipbuilding Company, Philadelphia, Pa., has been authorized by the court to sell the shipyard at either public or private sale after the property has been advertised five weeks.

The Glacier Metal Company, Richmond, Va., which is erecting a new plant at Manchester, across the James River from Richmond, will install a number of melting furnaces and is in the market for furnaces for the manufacture of Babbitt metal, brass, etc. The company will also be pleased to receive data on reclaiming metals from drosses, extracting tin from cans, etc. Pots containing from about 1,000 to 2,000 lbs. each will be installed.

The blast furnace of the Perry Iron Company, Erie, Pa., will be blown in this week.

British Legislation on Working Hours.

London Engineering says of some recent proposals of an increasingly socialistic character which the Labor movement in Great Britain is bringing forward:

The mania for over-legislation is not confined to socialists; it even affects sober-minded members of the House of Commons. Sir Charles Dilke's shop hours bill was read a second time on May 1, by a majority of 145. Now this bill proposes to limit the working hours in any and every case to a maximum of sixty hours per week, not only for shop assistants, but for the owner of the shop. It is an interference with personal liberty to an extent not hitherto attempted in any legislative measure. It does not allow for emergencies which are sure to arise in trade, especially in the case of shopkeepers. It is not at all likely that the bill will be further proceeded with this session, especially as the Government has promised a measure on the subject next year. In reply to a Labor member, it was stated by a member of the Government that its bill would cover the main principles of the bill before the House. But surely the Government will not propose to limit a man's own time; if so, why not that of editors and journalists, of doctors and lawyers, and the time of legislators themselves? It has long been recognized in this country that legislation is essential in cases of danger to life and health, especially as regards children and women. But to endeavor to put legal fetters upon men quite able to look after themselves is beyond the pale of rightful legislation. The plea of the miners may, possibly, be conceded, but even in that case it would be better for the parties concerned, rather than for legislation, to regulate the hours in the pits. Moreover, as it is, the shop hours act in force is scarcely complied with, and the measure before the House of Commons goes a great deal further. If socialism is designed to fetter human conduct in this way, wise men will give it a wide berth.

The Pittsburgh & Lake Erie Bridge, Beaver, Pa.

The Pittsburgh & Lake Erie Railroad Company will construct a double track cantilever bridge over the Ohio River at Beaver, Pa., located about 200 ft. up stream from the present bridge. It will be of cantilever construction, having a channel span of 769 ft., anchor arms 320 ft. long, and an approach span of 370 ft. at the Beaver end, making a total length of 1800 ft.

The weight of the bridge will be 13,500 tons. It is designed to support easily the heaviest train loads of 60,000 lb. per locomotive axle and 6000 lb. per lineal ft. on each of the two tracks. The floor system is made particularly massive, with skid girders along the inside of the trusses about 5 ft. above the track level to protect the bridge under all contingencies.

The masonry piers are about 120 ft. high and are founded on rock about 40 ft. below low water level. The bridge steel work will stand about 150 ft. above the masonry. The steel work has been designed by Albert Lucius of New York, consulting bridge engineer of the Pittsburgh & Lake Erie Railroad, under the direction of J. A. Atwood, chief engineer.

The contract for the masonry has been awarded to the Dravo Contracting Company, Pittsburgh, the work on which is now under way. The contract for the steel superstructure was this week awarded by Vice-President Schoonmaker to the McClintic-Marshall Construction Company of Pittsburgh. The total cost of the bridge is \$1,500,000 and it will be ready for service October 31, 1909.

The Franco-British Exposition, undertaken for the purpose of bringing the French and British nations closer together commercially, was opened in London, May 14. The buildings, 28 in number, occupy 200 acres, and the exhibits cover practically all lines of manufactures, arts and sciences, and natural products. The colonies of both countries are well represented.

The Iron and Metal Trades

The developments in the Pig Iron markets have been followed with the closest attention by the whole trade, because they illustrate what follows a sharp decline made to bring out buyers. The dead lock was broken by a leading Southern interest, which promptly booked a very large tonnage, and was followed by others with similar results. Their prices were then restored to the \$11.50 basis for No. 2 Foundry at Birmingham, other Southern makers advancing their price to \$12, with higher prices for distant deliveries. In some sections, notably the tidewater markets and New England, other sellers followed the break later on, the result being a decline during the past week, which brings them closer into line with prices reached before in the Central West. The result has been that a good deal of additional business has been closed in the Central West, and that a comparatively large tonnage has been placed at tidewater and in New England, Foundry No. 2 selling in that part of the country at \$16.75.

The transactions have been characterized as somewhat speculative on the part of the consumers, since they were certainly not made, in some conspicuous instances at least, in order to cover requirements actually in sight. In other words, melters have bought the Pig Iron because they were convinced that the prices were close to bottom, and not because the metal was actually needed. So far as can be learned the actual current consumption of the founders and other consumers of Pig Iron has not materially improved during the past month or six weeks. The atmosphere has cleared pretty thoroughly during the past two weeks and the Pig Iron business is on a much sounder basis.

It is, of course, an open question whether consumption could be stimulated by a reduction in prices of Finished Material. Thus far there is very little evidence that the determination on the part of the Steel interests, announced last week, to maintain prices, has caused the placing of orders which had been withheld in anticipation of a drop. That, at least, is true of the domestic trade. It is a curious fact that in the export business, which is developing very fairly, a number of orders long pending have been entered following the announcement of the result of the conference.

In the discussion of the present wide spread between the selling prices of Basic and Bessemer Pig Iron and of Steel Billets, one important point is forgotten. Nearly all the large rolling mills which have no Steel works, and must buy outside Steel, have sliding scale contracts for Billets based on the selling prices of Bessemer Pig. Such consumers of Billets, and in the Pittsburgh District alone they take far more than one-half of the tonnage, have been getting cheaper and cheaper Steel. It is estimated that the settlements recently were not far from \$24 per ton for Billets, when the nominal market rate is \$28.

There has been more activity in Structural Material. The McClintic-Marshall Company has during the past week closed for 21,000 tons, which includes about 13,500 tons for the Beaver bridge, 4000 tons for the Scranton shops and 1000 tons for a warehouse in Philadelphia. Quite a considerable number of minor contracts have been placed in Chicago and elsewhere.

There has been no improvement in Bars, and in spite of efforts to hold the industry together low prices continue to be made.

In the Merchant Pipe trade there are some good contracts in prospect. There is some talk of a 400-mile line of 16 to 18 in. pipe for the Hope Natural Gas Company and of 400 miles of 8 to 10 in. line Pipe for a Western oil company.

Cast Iron Pipe makers have little to complain of so far as tonnage is concerned, wretched though selling prices may be. Detroit has placed 6400 tons, and other lots have been contracted for. Syracuse will open bids on June 1 for 20,000 tons of 30 to 42 in. Cast Iron Pipe, and Rome calls for 3700 tons. The report that 20,000 tons of Steel Plates for the Brooklyn Water Works had been ordered is incorrect. There are questions of right of way pending, which may cause very considerable delay.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type,
Declines in Italics.

At date, one week, one month and one year previous.

PIG IRON, Per Gross Ton:	May 27, May 20, Apr. 29, May 29, 1908. 1908. 1908. 1907.			
Foundry No. 2, Standard, Philadelphia	\$16.75	\$16.75	\$17.50	\$25.50
Foundry No. 2, Southern, Cincinnati	14.75	14.75	15.00	24.25
Foundry No. 2, Local, Chicago ..	17.25	17.25	17.35	26.50
Bessemer, Pittsburgh	16.90	16.90	17.15	24.35
Gray Forge, Pittsburgh	14.90	14.90	15.40	22.90
Lake Superior Charcoal, Chicago	20.00	20.00	20.00	27.50

BILLETS, &c., Per Gross Ton:

Bessemer Billets, Pittsburgh ..	28.00	28.00	28.00	30.00
Forging Billets, Pittsburgh ..	30.00	30.00	30.00	35.00
Open Hearth Billets, Phila.	29.20	29.20	29.20	32.50
Wire Rods, Pittsburgh	35.00	35.00	35.00	37.00
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00

OLD MATERIAL, Per Gross Ton:

Steel Rails, Melting, Chicago ..	12.00	12.00	12.00	18.50
Steel Rails, Melting, Phila.	13.00	12.75	12.75	19.50
Iron Rails, Chicago	15.00	14.75	15.00	24.50
Iron Rails, Philadelphia	18.00	17.00	17.00	27.50
Car Wheels, Chicago	13.00	13.00	13.00	25.50
Car Wheels, Philadelphia	14.00	14.00	14.00	25.50
Heavy Steel Scrap, Pittsburgh ..	13.00	12.75	12.75	18.50
Heavy Steel Scrap, Chicago	11.00	10.75	10.75	16.00
Heavy Steel Scrap, Phila.	13.00	12.75	12.75	19.00

FINISHED IRON AND STEEL,

Per Pound:	Cents.	Cents.	Cents.	Cents.
Refined Iron Bars, Philadelphia ..	1.45	1.45	1.46	1.83½
Common Iron Bars, Chicago	1.65	1.65	1.65	1.76½
Common Iron Bars, Pittsburgh ..	1.50	1.50	1.50	1.75
Steel Bars, Tidewater, New York	1.76	1.76	1.76	1.84½
Steel Bars, Pittsburgh	1.60	1.60	1.60	1.60
Tank Plates, Tidewater, New York	1.86	1.86	1.86	1.84½
Tank Plates, Pittsburgh	1.70	1.70	1.70	1.70
Beams, Tidewater, New York ..	1.86	1.86	1.86	1.84½
Beams, Pittsburgh	1.70	1.70	1.70	1.70
Angles, Tidewater, New York ..	1.86	1.86	1.86	1.84½
Angles, Pittsburgh	1.70	1.70	1.70	1.70
Skelp, Grooved Steel, Pittsburgh	1.55	1.55	1.55	1.85
Skelp, Sheared Steel, Pittsburgh	1.65	1.65	1.65	1.90

SHEETS, NAILS AND WIRE,

Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, No. 27, Pittsburgh	2.40	2.40	2.40	2.50
Wire Nails, Pittsburgh	2.05	2.05	2.05	2.00
Cut Nails, Pittsburgh	1.85	1.90	1.90	2.05
Barb Wire, Galv., Pittsburgh ..	2.50	2.50	2.50	2.45

METALS, Per Pound:

	Cents.	Cents.	Cents.	Cents.
Lake Copper, New York	12.87½	13.00	13.00	24.25
Electrolytic Copper, New York ..	12.62½	12.87½	12.75	23.50
Spelter, New York	4.55	4.60	4.70	6.45
Spelter, St. Louis	4.40	4.50	4.57½	6.30
Lead, New York	4.35	4.25	4.10	6.00
Lead, St. Louis	4.20	4.12½	4.00	5.92½
Tin, New York	28.50	30.30	32.25	42.50
Antimony, Hallett, New York ..	8.50	8.50	8.75	17.00
Nickel, New York	45.00	45.00	45.00	45.00
Tin Plate, 100 lb., New York ..	\$3.89	\$3.89	\$3.89	\$4.09

Chicago.

FISHER BUILDING, May 27, 1908.—(By Telegraph.)

From a state of extreme uncertainty as to the real market level in Pig Iron, a clearer and more definite understanding has been evolved by the developments of the past two weeks. After a temporary recession from \$11.50, Birmingham, made by a Southern interest, the market has reacted, and this price now represents the inside figure at which tonnage is obtainable. Except for early deliveries, offers of \$11.50 would not now find ready acceptance, as most of the leading producers have advanced to \$12, Birmingham, for the second half, some even being unwilling to book into the fourth quarter at this price. Instead of being confined to the more important consumers, last week's transactions, which aggregated over 75,000 tons, included purchases by a large number of smaller buyers. While it is believed that not many melters are in urgent need of iron for immediate use, stocks are generally well reduced and buyers are convinced that forward requirements may be safely covered at present prices. The stirring activity in Pig Iron contrasts sharply with the listlessness which characterizes finished materials in nearly every department. Whether a reduction of Steel prices would result in stimulating buying is a question that is receiving much attention, and those taking the affirmative point to the effect of low prices of crude material in confirmation of their views. While a considerable number of contracts have been closed by fabricators, they were nearly all small, the aggregate being about 4500 tons. Rails, Plates, Bars and Sheets have produced nothing of noteworthy interest, and Wire Products are also on the wane. While there has been

no general improvement in the demand for Metals, some importance is attached to the purchase of a round lot of Copper by the Allis-Chalmers Company.

Pig Iron.—Started by the recent purchases of important tonnage by a few prominent consumers, the buying movement in Pig Iron has gained impetus and become more general, with the result that last week's sales in this market reached a volume far in excess of any like period for months. It is estimated that in all more than 75,000 tons of Foundry Iron was placed, the majority of which was taken by Southern furnaces. The business was fairly distributed among the several leading interests. The prevailing price secured for Southern Iron was \$11.50, Birmingham, though it is reported that a few sales were made at \$11. The general disposition of sellers was to restrict purchases to third quarter delivery though considerable of the business placed was for the entire second half. Before the end of the week the Woodward and Sloss-Sheffield companies had evidently entered all the tonnage they cared to take on at \$11.50, since additional orders amounting to several thousand tons were declined at this figure. The former has withdrawn all prices and the latter has advanced to \$12, Birmingham. The Republic Iron & Steel Company is holding at \$12, for third quarter business, while the Tennessee Coal, Iron & Railroad Company is taking on some tonnage for this period at \$11.50, but in common with all other sellers is not seeking orders for the fourth quarter at this price, nor is it anxious to extend bookings that far ahead, except at an advance over the present market. Notwithstanding the handicap of cheaper prices for Southern Iron, the Northern furnaces secured a fair portion of the business placed, their share of the whole amounting to about 25,000 tons. Included in this was the purchase of 10,000 tons by a local consumer; also several lots of Malleable Bessemer. That interest has not abated, as shown by the large number of inquiries still in the market, reflecting the conviction among the rank and file of melters that the limit of recession has been reached. In spite of the active demand that has developed, it is not believed that the melt has increased, so that practically all of the buying is for prospective requirements. As the situation now stands, the leading Southern furnaces have enough tonnage booked to provide for their present active furnace capacity pretty well through the third quarter at least, and are hopeful of securing higher prices for deliveries beyond that time. The second stack of the Northwestern Iron Company's furnace at Mayville, Wis., will be blown in next week, with the assurance of continued activity for the rest of the year. Through a typographical error in the Pig Iron quotations of last week's report, the price of Standard Bessemer was substituted for Malleable Bessemer, making the price \$18.40, when it should have been unchanged, at \$17.25. The following prices are for May and June delivery, f.o.b. Chicago:

Lake Superior Charcoal.....	\$20.00 to \$20.50
Northern Coke Foundry, No. 1.....	17.75 to 18.25
Northern Coke Foundry, No. 2.....	17.25 to 17.75
Northern Coke Foundry, No. 3.....	16.75 to 17.25
Northern Scotch, No. 1.....	18.25 to 18.75
Southern Coke, No. 1.....	16.35 to 16.85
Southern Coke, No. 2.....	15.85 to 16.35
Southern Coke, No. 3.....	15.35 to 15.85
Southern Coke, No. 4.....	14.85 to 15.35
Southern Coke, No. 1 Soft.....	16.35 to 16.85
Southern Coke, No. 2 Soft.....	15.85 to 16.35
Southern Gray Forge.....	13.85 to 14.35
Southern Mottled.....	13.60 to 14.10
Malleable Bessemer.....	17.25 to 17.75
Standard Bessemer.....	18.40 to 18.90
Jackson Co. and Kentucky Silvery, 6 %	18.90 to 19.40
Jackson Co. and Kentucky Silvery, 8 %	20.90 to 21.40
Jackson Co. and Kentucky Silvery, 10 %	22.90 to 23.40

(By Mail.)

Billets and Rods.—New business in Billets is extremely quiet. There is practically no demand for Forging Billets, nor are there any inquiries indicating the prospective development of orders. Prices on Forging Billets are maintained at the regular quotation of \$31.50 to \$32.50, Chicago. A moderate amount of specifications against contracts is about all there is doing in Wire Rods; very little new business is being placed. Prices of Rods are unchanged, as follows: Bessemer, \$35; Basic, \$36; Chain, \$37, all at Pittsburgh.

Rails and Track Supplies.—Aside from an order of about 700 tons of traction Rails taken by the Illinois Steel Company, no Rail orders of any note have been entered during the week. The prospect of immediate purchases of round lots by any of the railroads is by no means encouraging. Specifications are, however, coming in a little more freely this month, and the local mill is running along at moderate capacity. Some improvement is noted in Light Rails, orders for which, though not of large tonnage individually, are more frequent. Sales made by the principal interest for the present month aggregate up to this time about 3000 tons. The demand for Light Rails is coming principally from the coal mines, with a small percentage of orders from the lumber mills. Not much new business in Spikes and Fastenings has been entered during the week, but the volume of specifications has improved. We quote as follows: Angle Bars, accompanying Rail orders, 1908 delivery, 1.50c.; car lots, 1.60c. to 1.70c.; Spikes, 1.80c. to 1.90c., according to delivery; Track Bolts, 2.25c. to 2.35c., base, Square Nuts,

and 2.40c. to 2.50c., base, Hexagonal Nuts. The store prices on Track Supplies range from 0.15c. to 0.20c. above mill prices. Light Rails, 25 to 45 lb., \$28; 20-lb., \$29; 16-lb., \$30; 12-lb., \$31. Standard Sections, \$28, f.o.b. mill, full freight to destination.

Structural Material.—Following the activity of the previous week, which resulted in the closure of a number of important contracts, the business of last week is in point of tonnage comparatively small. It is comprised of quite a number of small projects, the promoters of which seem to have concluded that the prices offered were about as low as would be available anywhere in the near future. Among the contracts taken by fabricators, which in all amounted to about 4500 tons, the following list comprises the principal ones: University of California, Berkeley, 937 tons; the Illinois Central Railroad, bridge at the Kensington & Eastern crossing of the Nickel Plate, 1500 tons; warehouse at Salt Lake City, 258 tons, all taken by the American Bridge Company; Galloway, Hooch & Francis Building, Salt Lake City, and a small structure for the Kings Hill Irrigation Company, Idaho, comprising about 100 tons, secured by the Minneapolis Steel & Machinery Company; 250 tons for a post office building for Colorado Springs, awarded to the Des Moines Bridge & Iron Works. Dyer Brothers, San Francisco, secured a contract from the United Railways for 375 tons, and about 200 tons of roof trusses for Coliseum Building, St. Louis, went to the Central States Bridge Company, Indianapolis. The general contract for the Chico Landing Bridges over the Sacramento River, requiring 325 tons, was taken by Cotton Brothers, San Francisco. The proposed conversion of an eight track stationary bridge over the Drainage Canal, Chicago, into a rolling lift span has been abandoned by the Drainage Board, and it is understood that plans are being prepared for a new bridge to take the place of this structure. The estimating departments of fabricating shops are fairly busy on new projects which it is believed will develop into actual orders with less hesitation and delay than has been experienced for a number of months. Prices from store are quoted without change, at 2.05c. to 2.10c., and mill prices at Chicago are as follows: Beams and Channels, 3 to 15 in., inclusive, 1.88c.; Angles, 3 to 6 in., ¼-in. and heavier, 1.88c.; larger than 6 in. on one or both legs, 1.98c.; Beams, larger than 15 in., 1.98c.; Zees, 3 in. and over, 1.88c.; Tees, 3 in. and over, 1.93c., in addition to the usual extras.

Plates.—Plate using industries are exceedingly quiet, and are placing only small orders for such material as is needed for current work. Under these conditions the mills are naturally getting very little new business, and their accumulation of tonnage both from this source and specifications is sufficient to keep them running only intermittently at part capacity. The situation as to price is unchanged—the principal producers still maintaining the regular quotations, while concessions of from \$2 to \$3 a ton on narrow sizes are obtainable from a few sources. We quote mill shipments, as follows: Tank Plates, ¼-in. and heavier, wider than 6¼ and up to 100 in. wide, inclusive, car lots, Chicago, 1.88c. to 2.08c.; 3-16 in., 1.98c. to 2.18c.; Nos. 7 and 8 gauge, 2.08c. to 2.23c.; No. 9, 2.13c. to 2.33c.; Flange quality, in widths up to 100 in., 1.98c. to 2.08c., base, for ¼-in. and heavier, with the same advance for lighter weights; Sketch Plates, Tank quality, 1.98c. to 2.18c.; Flange quality, 2.08c. Store prices on Plates are as follows: Tank Plates, ¼-in. and heavier, up to 72 in. wide, 2.10c. to 2.20c.; from 72 to 96 in. wide, 2.20c. to 2.30c.; 3-16 in. up to 60 in. wide, 2.20c. to 2.35c.; 72-in. wide, 2.40c. to 2.50c.; No. 8 up to 60 in. wide, 2.20c. to 2.25c.; Flange and Head quality, 0.25c. extra.

Sheets.—A sagging tendency has developed in Sheets, and new business for the past week or two has been discouragingly light. Neither jobbers nor manufacturers are disposed to anticipate their wants, and the new orders entered are few in number and of small tonnage. No departure from the regular policy of price maintenance is noted so far as the principal mills are concerned, and it is claimed that whatever concessions are being made are confined to a few of the smaller mills. We quote mill shipments, as follows, Chicago: Blue Annealed, No. 10, 1.98c.; No. 12, 2.05c.; No. 14, 2.08c.; No. 16, 2.18c.; Box Annealed, Nos. 17 to 21, 2.43c.; Nos. 22 to 24, 2.48c.; Nos. 25 and 26, 2.53c.; No. 27, 2.58c.; No. 28, 2.68c.; No. 29, 2.78c.; No. 30, 2.88c.; Galvanized Sheets, Nos. 10 to 14, 2.63c.; Nos. 15 and 16, 2.83c.; Nos. 17 to 21, 2.98c.; Nos. 22 to 24, 3.13c.; Nos. 25 and 26, 3.33c.; No. 27, 3.53c.; No. 28, 3.73c.; No. 30, 4.23c.; Black Sheets from store: Blue Annealed, No. 10, 2.20c.; No. 12, 2.25c.; No. 14, 2.30c.; No. 16, 2.40c.; Box Annealed, Nos. 18 to 21, 2.60c.; Nos. 22 to 24, 2.65c.; No. 26, 2.70c.; No. 27, 2.75c.; No. 28, 2.85c.; No. 30, 3.25c.; Galvanized from store: Nos. 10 to 16, 3c.; Nos. 18 to 20, 3.15c.; Nos. 22 to 24, 3.30c.; No. 26, 3.50c.; No. 27, 3.70c.; No. 28, 3.90c.; No. 30, 4.40c. to 4.45c.

Bars.—There is no improvement in Steel Bars and, as far as new business is concerned, orders are coming out quite slowly and in small lots. The volume of specifications offered is likewise greatly reduced, so that it is impossible for the mills to run more than a week or 10 days in a month. Rolling schedules of the Bar mills are made up chiefly from

specifications on existing contracts which, being unsupported by new orders, are but scantily supplied. In the absence of orders of attractive tonnage no adequate test of the market is afforded, although reports of concessions on Bar Iron made by some of the less important mills are current. Regular prices, Chicago, are as follows: Steel Bars, 1.78c., with half extras; Iron Bars, 1.65c.; Hoops, 2.18c., extras as per Hoop card; Bands, 1.78c., as per Bar card, half extras; Soft Steel Angles and Shapes, 1.88c., half extras. Store prices are as follows: Bar Iron, 2.10c. to 2.25c.; Steel Bars, 2c. to 2.10c.; Steel Bands, 2c., as per Bar card, half extras; Soft Steel Hoops, 2.35c. to 2.45c., full extras.

Merchant Pipe.—The past week has shown a little improvement in the general tonnage average of orders, which is regarded as an indication of a better movement in jobbers' stocks. The aggregate increase, however, is not notably large, though it is expected that the total business for the present month will show a fair margin of increase over April. Buyers of Tubular goods have not been induced to withhold orders for fear of an impending decline to the same extent as in some other lines since their purchases are protected for a reasonable period. Notwithstanding this, orders are being placed only to cover nearby requirements. Regular prices are reported to be firmly maintained. The following mill discounts are quoted: Black Pipe, $\frac{3}{4}$ to 6 in., 71.2; 7 to 12 in., 68.2; Galvanized, $\frac{3}{4}$ to 6 in., 61.2. These discounts are subject to one point on the base. From store, in small lots, Chicago jobbers quote 71 per cent. on Black Steel Pipe, $\frac{3}{4}$ to 6 in. From two to three points above these prices is asked for Iron Pipe.

Boiler Tubes.—A few small orders for Locomotive Tubes on requisitions for repair work represent the extent of railroad purchases. Merchant Tubes are equally quiet, and orders from jobbers for replenishment of stocks are limited and infrequent. Mill quotations for future delivery, on the base sizes, are as follows: 2 $\frac{3}{8}$ to 5 in., in carload lots, Steel Tubes, 63.2; Iron, 50.2; Seamless, 49.2; 2 $\frac{1}{2}$ in. and smaller, and lengths over 18 ft., and 2 $\frac{1}{2}$ in. and larger, and lengths over 22 ft., 10 per cent. extra. Store prices are as follows:

	Steel.	Iron.	Seamless.
1 to 1 $\frac{1}{2}$ in.....	35	35	35
1 $\frac{3}{4}$ to 2 $\frac{1}{4}$ in.....	50	35	35
2 $\frac{1}{2}$ in.....	52 $\frac{1}{2}$	35	35
2 $\frac{3}{8}$ to 5 in.....	60	47 $\frac{1}{2}$	47 $\frac{1}{2}$
6 in. and larger.....	50	35	..

Merchant Steel.—It is quite evident from the meagerness of orders being placed by the implement makers that no developments of interest are in prospect from this quarter. Neither is there anything in the run of orders being entered for Steel and Iron Tire from jobbers and vehicle makers to indicate improvement. Quotations are as follows: Planished or Smooth Finished Tire Steel, 1.98c.; Iron Finish up to 1 $\frac{1}{2}$ x $\frac{1}{2}$ in., 1.93c., base, Steel card; Iron Finish, 1 $\frac{1}{2}$ x $\frac{1}{2}$ in. and larger, 1.78c., base, Tire card; Channels for solid Rubber Tires, $\frac{3}{4}$ to 1 in., 2.28c., and 1 $\frac{1}{2}$ in. and larger, 2.18c.; Smooth Finished Machinery Steel, 2.18c.; Flat Sleigh Shoe, 1.93c.; Concave and Convex Sleigh Shoe, 2.08c.; Cutter Shoe, 2.46 $\frac{1}{2}$ c.; Toe Calk Steel, 2.33c.; Railroad Spring, 1.98c.; Crucible Tool Steel, 7 $\frac{1}{4}$ c. to 8c., and still higher prices are asked on special grades. Shafting, 56 per cent. off in car lots; 52 per cent. in less than car lots, base territory delivery.

Cast Iron Pipe.—Pipe contracts secured by the United States Cast Iron Pipe & Foundry Company include 500 tons from Dayton, Ohio; 1000 tons, Portland, Ore.; 300 tons, Ponca, Okla.; 300 tons, Milan, Mich. In addition to these lettings there were awarded to the Texas State Penitentiary Foundry, 2100 tons for Roswell, N. M., and to the Dimmick Pipe Company, 6500 tons by the city of Detroit, Mich. A letting of 500 tons is scheduled for June 2 by the Board of Trustees of Water Works, Cincinnati, Ohio. There is practically no change in the situation as respects prices. The market is an open one, every seller being governed by circumstances and conditions surrounding his own interests. We quote, nominally, per net ton, Chicago, as follows: Water Pipe, 4-in., \$27; 6 to 12 in., \$26; 16-in. and up, \$25; with \$1 extra for Gas Pipe.

Metals.—The purchase of Copper for last half requirements by the Allis-Chalmers Company, Milwaukee, was the most notable transaction in Metals for the week. Outside of this sale only a few orders for immediate use were placed by consumers. Apparently it is not distrust of price levels so much as lack of present and prospective business that restricts purchases of Metals. Lead is somewhat firmer while Pig Tin is a little easier. We quote as follows: Casting Copper, 13 $\frac{1}{4}$ c.; Lake, 13 $\frac{1}{2}$ c. to 13 $\frac{3}{4}$ c., in car lots for prompt shipment; small lots, $\frac{1}{4}$ c. to $\frac{3}{8}$ c. higher; Pig Tin, car lots, 32c.; small lots, 32 $\frac{1}{2}$ c.; Lead, Desilverized, 4.40c. to 4.55c., for 50-ton lots; Corroding, 4.80c. to 4.90c., for 50-ton lots; in car lots, 2 $\frac{1}{4}$ c. per 100 lb. higher; Spelter, 5c.; Cookson's Antimony, 10 $\frac{1}{2}$ c., and other grades, 9 $\frac{1}{4}$ c. to 10 $\frac{1}{4}$ c.; Sheet Zinc is \$7 list, f.o.b. La Salle, in car lots of 600-lb. casks. On Old Metals we quote: Copper Wire, 12 $\frac{3}{4}$ c.; Heavy Copper, 12 $\frac{1}{2}$ c.; Copper Bottoms, 10 $\frac{1}{2}$ c.; Copper Clips, 11c.; Red Brass, 11 $\frac{1}{2}$ c.; Yellow Brass, 9 $\frac{1}{2}$ c.; Light Brass, 6 $\frac{1}{2}$ c.;

Lead Pipe, 4c.; Zinc, 3 $\frac{3}{4}$ c.; Pewter, No. 1, 21c.; Tin Foil, 25c.; Block Tin Pipe, 27c.

Old Material.—Re-rolling Steel Rails hold the lead in point of activity over other Scrap grades; at the same time there is no vigorous demand even for these, but the price is sustained by offers from short-interests among dealers. Notwithstanding there is but a light demand from consumers, prices have suffered no further decline, save perhaps in Relaying Rails, one small lot of which—52-lb. Section—sold at \$19, with Angles attached. A local builder of industrial roads and equipment was in the market during the week for 14 miles of Standard Section Relaying Rails, but as far as known no order was placed. It is reported that a large user of Heavy Melting Steel has an inquiry out for a round lot of this material, which is perhaps responsible for a slight stiffening noted in the prices asked. It is estimated that the stock accumulations in Chicago dealers' yards now amount to fully 200,000 tons, and this is moving too slowly to admit of large additions. The railroads have offered very little tonnage in the past two weeks, and there are no lists reported for this week. The Illinois Central is, however, offering at private sale a lot estimated at about 5000 tons. We quote, per gross ton, f.o.b. Chicago, as follows:

Old Iron Rails.....	\$15.00 to \$15.50
Old Steel Rails, re-rolling.....	13.00 to 13.50
Old Steel Rails, less than 3 ft.....	12.00 to 12.50
Relaying Rails, standard sections, sub- ject to inspection.....	20.50 to 21.50
Old Car Wheels.....	13.00 to 13.50
Heavy Melting Steel Scrap.....	11.00 to 11.50
Frogs, Switches and Guards, cut apart.....	11.75 to 12.25
Mixed Steel.....	8.50 to 9.00

The following quotations are per net ton:

Iron Fish Plates.....	\$13.00 to \$13.50
Iron Car Axles.....	16.00 to 16.50
Steel Car Axles.....	14.50 to 15.00
No. 1 Railroad Wrought.....	10.75 to 11.25
No. 2 Railroad Wrought.....	9.75 to 10.25
Railway Springs.....	10.75 to 11.25
Locomotive Tires, smooth.....	12.50 to 13.00
No. 1 Dealers' Forge.....	9.00 to 9.50
Mixed Busheling.....	6.75 to 7.25
Iron Axle Turnings.....	5.50 to 6.00
Soft Steel Axle Turnings.....	5.50 o 6.00
Machine Shop Turnings.....	5.00 to 5.50
Cast Borings.....	4.00 to 4.50
Mixed Borings, &c.....	4.00 to 4.50
No. 1 Mill.....	6.50 to 7.00
No. 2 Mill.....	5.50 to 6.00
No. 1 Boilers, cut to Sheets and Rings.....	6.75 to 7.25
No. 1 Cast Scrap.....	11.50 to 12.00
Stove Plate and Light Cast Scrap.....	10.00 to 10.50
Railroad Malleable.....	10.00 to 10.50
Agricultural Malleable.....	9.75 to 10.25
Pipes and Flues.....	7.50 to 8.00

Birmingham.

BIRMINGHAM, ALA., May 25, 1908.

Pig Iron.—Recent developments have been of such a nature as to warrant the statement that the market is on a firmer basis than at any time since the depression. Inquiries from practically all lines of foundry trades have come forward in larger proportions, and the sales that have resulted foot up to figures similar to those commonly reported for the same period when conditions were normal. The percentage of engagements that is known to represent speculative purposes is notable, and the eagerness to cover for anticipated requirements that has been displayed by large melters further indicates an improvement in conditions. Producers generally appear confident that prices have reached their lowest level, and notwithstanding the fact that the recent activity of the market may be to some extent the result of material departures from the established quotations, the schedule of \$11.50, Birmingham, is reaffirmed and could hardly be shaded. A number of attempts to place tonnage at such a basis for delivery over the last quarter have been unsuccessful, while the sale of 1000 tons of High Manganese Iron for delivery covering the last half is reported at \$13. There seems to be no doubt that producers have the situation well in hand. Order book requirements in all cases are believed to be equal to the stock on furnace yards and the output, without indications that additional capacity will soon be put in operation. The present largest producer is known to be contemplating withdrawal from the market, and the second largest reports 50 per cent. of its output for the third quarter disposed of. One of the smaller concerns is practically out of the market for the third quarter and manifests most reluctance in making quotations on deliveries further advanced. The output of Basic Iron has not been increased, but one furnace has recently been put in operation on Charcoal Iron.

Cast Iron Pipe.—The city of Louisville, Ky., is to place a contract of fair proportions on June 1, and bids on a significant tonnage for Cienfuego, Cuba, will be opened June 15. The aggregate of smaller orders to be placed within the next 30 days is estimated at 85,000 tons. A Southern maker will furnish 6400 tons of Water Pipe for the city of Detroit, Mich. A large contract for Porto Rico has also been placed in the South, as well as contracts for 1000 tons of Gas Pipe

each for gas works at Los Angeles, Cal., and Portland, Ore. The city of Roswell, N. M., has recently placed a contract for 2100 tons of Water Pipe. The decline in prices seems to have been effectually checked and the following quotations are firm for moderate lots of Water Pipe per net ton, f.o.b. cars here: 4 to 6 in., \$23; 8 to 12 in., \$22; over 12-in., average \$21, with \$1 per ton extra for Gas Pipe. On large contracts for municipalities these quotations are probably shaded.

Old Material.—The aggregate of sales reported does not indicate an improvement in the demand, but further decline in prices has not been suffered. Recent announcements favor the resumption of operations at Steel plants, and in view of the number of inquiries for Cast Scrap and Stove Plate that are pending dealers are somewhat encouraged. Nominal quotations are as follows, per gross ton, f.o.b. cars here:

Old Iron Rails.....	\$15.00 to \$15.50
Old Iron Axles.....	14.00 to 15.00
Old Steel Axles.....	12.50 to 13.00
No. 1 Railroad Wrought.....	12.00 to 12.50
No. 2 Railroad Wrought.....	9.00 to 9.50
No. 1 Country Wrought.....	10.50 to 11.00
No. 2 Country Wrought.....	9.50 to 10.00
Wrought Pipes and Flues.....	8.50 to 9.00
No. 1 Steel.....	9.50 to 10.00
No. 1 Machinery Cast.....	9.00 to 9.50
Stove Plate and Light Cast.....	8.50 to 9.00
Cast Borings.....	5.00 to 5.50

Pittsburgh.

PARK BUILDING, May 27, 1908.—(By Telegraph.)

Pig Iron.—Following the heavy buying movement which broke out a week or 10 days ago in Basic and Foundry Iron, transactions this week have been confined mostly to small lots, but there is a good deal of inquiry in the market, with prospects of some heavy tonnages being sold. The sales of Basic will cause the blowing in of several furnaces in the valleys. Cherry Valley of the United Iron & Steel Company, at Leetonia, Ohio, started up May 20, after being shut down for three or four months, and No. 4 stack of the Shenango Furnace Company, at Sharpsville, Pa., will start about June 1, while the new No. 1 stack, under erection for some months, will soon be finished, and is expected to start about July 1. For the week ending May 23, the output of the merchant blast furnaces in the two valleys that are in blast was 6200 tons. Stocks of Iron at these furnaces decreased last week from 53,000 to 45,000 tons. At present Youngstown Steel and No. 3 of Shenango Furnace Company are running on Bessemer; Dover of M. A. Hanna & Co., on Basic; one Andrews & Hitchcock, on Foundry; one Stewart Iron Company on Low Phosphorus, and Struthers on Basic. We quote Bessemer Iron at \$16, Basic \$15.25 to \$15.50; Northern No. 2 Foundry, \$15, and Northern Gray Forge, \$14, all at Valley furnace, the freight rate to Pittsburgh being 90c. per ton.

Steel.—The market is very dull and there is no new demand for Billets. About a fair volume of business is moving in Sheet and Tin Bars. Most consumers of Billets are covered by sliding scale contracts based on the price of Pig Iron. On ordinary business we quote \$28, Pittsburgh, and \$28.50, Youngstown or Wheeling, for Bessemer and Open Hearth Billets; Sheet and Tin Bars taking \$1 advance, and Forging Billets \$2 advance.

Merchant Pipe.—It is reported that the Columbia Oil & Gas Company, Huntington, W. Va., has placed an order with the National Tube Company for about 180 miles of 16 and 20 in. Line Pipe, for carrying natural gas from Huntington to Cincinnati, Ohio. The order was tentatively placed with the National Tube Company nearly two years ago, but owing to delays in securing rights of way, &c., actual work on the line has not been started. As soon as some minor details are arranged it is probable that deliveries on this contract will begin to go forward.

(By Mail.)

The total sales of Pig Iron made by Northern and Southern furnace interests, since the buying movement started about two weeks ago, will aggregate close to 200,000 tons. Of this amount, Western interests are understood to have taken upward of 75,000 tons. The American Steel Foundries is credited with having bought 40,000 tons; the Commonwealth Steel Company, 10,000 tons, and International Harvester Company, 10,000 tons. The Allegheny Steel Company, a local interest with an open hearth steel plant and sheet mills at Avenue, Pa., has bought about 10,000 tons of Basic for delivery over the last six months of the year, and other smaller interests have bought 5000 to 10,000 tons. The Basic went on the basis of \$15, Valley furnace, but it is now stated that some of the furnaces are holding their Iron for \$15.25, although no sales have been made at this price so far. These are purely speculative purchases on the part of melters, who believe that prices of Pig Iron have touched bottom, and they are willing to go in and bdy, it being understood that they have not the orders for Finished Material on their books to use up this Iron. The Sloss-Sheffield Iron & Steel Company, which is credited with having sold a large

tonnage of No. 2 Foundry on the basis of \$10.75, Birmingham, is now understood to be quoting \$12, and other Southern interests have advanced their prices. As yet the buying movement in Pig Iron has not extended to Bessemer or Forge, and nothing is doing in these two grades. There is an impression that after the Republican National convention, should an acceptable candidate be nominated, a buying movement on the part of railroads will start. It is stated that the Pennsylvania Railroad is holding back orders for Rails and other supplies until after the Presidential nomination. The situation in Steel is quiet, but a fair business in Sheet and Tin Bars is being done. Steel Billets are very dull. The large Steel interests are reported as firmly maintaining prices on the basis of \$28 for Bessemer and Open Hearth Billets, but, as is well known, most consumers of Billets have sliding scale contracts, based on the price of Pig Iron, by which their Billets cost them much less than this price. The heavy decline in Bessemer Iron carried with it a decline in the price of Steel on these contracts, and it is understood that a number of large consumers of Billets are not paying over \$25, at mill. The demand for Finished Iron and Steel on the whole is showing betterment. Some fairly large contracts for Structural Material have been placed, and there is a little better inquiry for Plates and Steel Bars which have been dull for some time. Sheets are quiet, but Tin Plate is fairly active, and Pipe is in moderate demand, with some very large orders pending in oil and gas lines. The Coke situation continues dull, but a better demand for Furnace Coke is expected before long, as a number of furnaces now out of blast are getting ready to resume. Scrap is better, and prices are stronger, but a still better demand is expected after July 1, when the wage scales are out of the way, and the mills have finished taking stock and making repairs. Taken as a whole, the situation in the Steel trade is showing encouraging signs, and there is more optimistic talk in the Steel trade to-day than in the last two or three months.

Ferromanganese.—Quite a few inquiries are in the market, representing 500 to 600 tons, and in sympathy with the better feeling in Pig Iron, prices on Ferro are firmer and probably \$1 a ton higher. We quote \$44.50 for prompt Ferro and \$45 seaboard for delivery over last half of the year. We note a sale of two cars, or about 50 tons, for prompt shipment at \$44.50, seaboard. On an inquiry for 200 tons for last half \$45 has been quoted. A considerable tonnage of Ferro for second half of the year delivery is likely to be sold in the next week or two.

Ferrosilicon.—A local consumer is in the market for 300 tons, on which it is probable that a fairly low price will be made. We quote 50 per cent. at \$67 to \$67.50, f.o.b. Pittsburgh.

Muck Bar.—As yet there is no demand, and in the absence of sales we quote best grades of Muck Bar at nominally \$26 a ton. The plant of the Shenango Iron & Steel Company, at Wheatland, Pa., which was one of the leading makers of Muck Bar for the open market, is now idle.

Skelp.—Some inquiry is noted for Steel Skelp for reasonably prompt delivery. The mills rolling Skelp are operating to possibly 50 per cent. of capacity, but mostly on specifications against old orders. Grooved Steel Skelp is 1.55c. to 1.60c.; Sheared Steel Skelp, 1.65c. to 1.70c.; Grooved Iron Skelp, 1.75c. to 1.80c.; Sheared Iron Skelp, 1.85c. to 1.90c., Pittsburgh.

Rods.—Although there is practically no inquiry, the leading maker of Rods is holding firmly on the basis of \$35 for Bessemer, \$36 for Open Hearth and \$37 for Chain Rods, f.o.b. Pittsburgh. The Youngstown Sheet & Tube Company, who recently bought the plant of the Morgan Spring Company at Struthers, Ohio, is soliciting inquiries for Bessemer Rods. This company has an excellent plant capable of turning out about 200 tons of Rods per day.

Structural Material.—More actual tonnage has been placed in the past week in this market than in the past two or three months. The McClintic-Marshall Construction Company has taken the contract for the Pittsburgh & Lake Erie bridge at Beaver, about 13,500 tons, and also the material, 4000 tons, for the Scranton shops of the Delaware, Lackawanna & Western, while the Carnegie Steel Company has taken 1400 tons for the extension to the Port Pitt Hotel in this city. The Jones & Laughlin Steel Company has taken about 800 tons for two bank buildings at Youngstown, Ohio, and the American Bridge Company 400 tons for some small girder bridges on the Florida East Coast Railroad. Inquiries are in the market for the extension to the Horne Building in this city, 2500 to 3000 tons, but this work may be held up for some little time. It is understood that a relatively low price was made on the Fort Pitt Hotel, and there is still general complaint among Structural concerns of the low prices ruling for fabricated work, which in some cases are said to be below actual cost. There is a fair amount of new work in sight, but it develops slowly. It is expected that the affirming of prices in New York last week on Structural Material may possibly bring out some work that had been held up in the belief that a reduction in prices would be made. We are advised the mills are holding firmly prices for plain material, as follows: Beams and Channels,

up to 15 in., 1.70c.; over 15 in., 1.80c.; Angles, 3 x 2 x 1/4 in. thick, up to 6 x 6 in., 1.70c.; 8 x 8 and 7 x 3 1/2 in., 1.80c.; Zees, 3 in. and larger, 1.70c.; Tees, 3 in. and larger, 1.75c.; Bulb Angles and Deck Beams, 2c. Under the Steel Bar card, Angles, Channels and Tees under 3 in. are 1.70c., base, for Bessemer and Open Hearth, subject to half extras on the Standard Steel Bar card.

Steel Rails.—The Carnegie Steel Company the past week took orders for about 1500 tons of Light Rails, but as yet no contracts of moment for Standard Sections are being placed. Reports are that two or three leading railroads will give out some large orders for Rails after the Republican Presidential nomination is made. Nos. 1 and 2 Rail mills of the Carnegie Steel Company, at Bessemer, are in operation to about 35 or 40 per cent. of capacity, while No. 3 mill, on which Light Rails are rolled, has been shut down for three weeks, but is expected to start on Sunday night, May 31. Regular prices on Light Rails, which continue to be shaded from \$3 to \$4 a ton by rerolling mills, are as follows: 25 to 45 lb. Sections, \$28; 20-lb., \$29; 16-lb., \$30, and 12-lb., \$32. We quote Standard Sections at \$28, at mill, and Angle Splice Bars at 1.65c., at mill.

Plates.—The city of Seattle, Wash., is in the market for quite a large tonnage of Plates for extensions to its water mains, the contracts having been placed with the T. A. Gillespie Company of this city. The Carnegie Steel Company has taken orders for 200 tons or more of Plates for this work, and additional tonnage is to be placed before long. The general demand for Plates is quiet, only small orders for actual needs being placed. The Steel car interests and the boatbuilders are not placing any orders. On narrow sizes prices are being shaded about \$2 a ton by some of the smaller mills. Regular prices are as follows: Tank Plates, 3/4-in. thick, 6 1/4 in. up to 100 in. wide, 1.70c., base, at mills, Pittsburgh. Extras over this price are as follows:

	Extra per 100 lb.
Gauges lighter than 1/4-in. to and including 3-16-in.	
Plates on thin edges.....	\$0.10
Gauges Nos. 7 and 8.....	.15
Gauge No. 9.....	.25
Plates over 100 to 110 in.....	.05
Plates over 110 to 115 in.....	.10
Plates over 115 to 120 in.....	.15
Plates over 120 to 125 in.....	.25
Plates over 125 to 130 in.....	.50
Plates over 130 in.....	1.00
All sketches (excepting straight taper Plates varying not more than 4 in. in width at ends, narrowest end being not less than 30 in.).....	.10
Complete Circles.....	.20
Boiler and Flange Steel Plates.....	.10
"A. B. M. A." and ordinary Firebox Steel Plates..	.20
Still Bottom Steel.....	.30
Marine Steel.....	.40
Shell grade of steel is abandoned.	

TERMS.—Net cash 30 days. Pacific Coast base, 1.60c., f.o.b. Pittsburgh, with all rail tariff rate of freight to destination added, no reduction for rectangular shapes, 14 in. wide down to 6 in. of Tank, Ship or Bridge quality.

Sheets.—The demand for both Black and Galvanized Sheets is light, and the Sheet trade is in rather unsatisfactory condition. Consumers still seem to have the idea that prices will be lower and are withholding orders, while specifications on old contracts are hung up in a good many cases. Regular prices, which we are advised are being held by the mills, are as follows: Blue Annealed Sheets, No. 10 and heavier, 1.80c.; Nos. 11 and 12, 1.85c.; Nos. 13 and 14, 1.90c.; Nos. 15 and 16, 2c.; Box Annealed, Nos. 17 to 21, 2.25c.; Nos. 22 to 24, 2.30c.; Nos. 25 and 26, 2.35c.; No. 27, 2.40c.; No. 28, 2.50c.; No. 29, 2.60c.; No. 30, 2.70c. Galvanized Sheets: Nos. 10 and 11, 2.45c.; Nos. 12 and 14, 2.55c.; Nos. 15 and 16, 2.65c.; Nos. 17 to 21, 2.80c.; Nos. 22 and 24, 2.95c.; Nos. 25 and 26, 3.15c.; No. 27, 3.35c.; No. 28, 3.55c.; No. 29, 3.70c.; No. 30, 3.95c. No. 28 Painted Roofing Sheets, \$1.75 per square, and Galvanized Roofing Sheets, No. 28, \$3.10 per square, for 2 1/2-in. corrugations. These prices are subject to a rebate of 5c. per 100 lb. to the large trade under the usual conditions, jobbers charging the usual advances for small lots from store.

Tin Plate.—Indications are favorable for a large fruit crop this year, and it is expected that early in July a heavy demand will set in for Bright Plates from the canning interests. The mills have a fair amount of work ahead of them, and the American Sheet & Tin Plate Company continues to operate to nearly full capacity. We quote at \$3.70 for 100-lb. Cokes, 14 x 20 f.o.b. Pittsburgh, terms 30 days, less 2 per cent. off for cash in 10 days, this price being subject to the usual rebate of 5c. per base box in large lots.

Hoops and Bands.—Practically no new business is being placed, and specifications against contracts are only fair. Regular prices are as follows: Steel Hoops at \$2, base, full Hoop card extras; Steel Bands, \$1.60, base, half Steel card extras, all f.o.b. cars, Pittsburgh, Pa., in carload lots, for delivery during 1908.

Cotton Ties.—Most of the Cotton Ties required for this year have been ordered, and buyers are now specifying against their contracts. The quantity needed this year will be somewhat smaller than last year. We quote as follows: 3000

bundle lots and over, 85c., less than 3000 bundle lots, 88c., f.o.b. Pittsburgh.

Iron and Steel Bars.—As yet there is no improvement whatever in the demand for Iron and Steel Bars, consumers placing orders only for absolute needs. The reaffirming of prices by the Steel interests in New York on May 21 was expected to lead to a larger demand for Bars, but as yet this has not developed. We are advised that the leading mills rolling Iron and Steel Bars are absolutely adhering to regular prices, and that if any shading is being done, it is by small mills that do not make a full assortment of sizes. A conference is to be held at Cambridge Springs, Pa., next Tuesday, between the Western Bar Iron Association and the Amalgamated Association on the puddling and finishing scales which will expire June 30, but it is believed that there will be no trouble in arriving at a settlement for the new scale year. The Amalgamated Association has not asked for any advances, and it is not thought the mills will demand a reduction. We quote Iron Bars at 1.50c. for the Pittsburgh District, and 1.47c., Pittsburgh, for Chicago and points further west. Steel Bars remain firm, at 1.60c., Pittsburgh.

Spelter.—The Spelter market is in an unsatisfactory condition, the demand being dull, while prices of Ores are steadily declining. Prime Western grades are offered at 4.40c., St. Louis, or 4.52 1/2c., Pittsburgh. Consumers are buying only for actual needs and in small lots.

Railroad Spikes.—The Cleveland, Cincinnati & St. Louis Railroad has recently placed an order for 1000 kegs, but the general buying of Spikes by the railroads is light. There is a fair demand for the smaller sizes. We quote: Standard sizes, 4 1/2 x 9-16 in., at \$1.70, and the smaller sizes at \$1.80 per 100 lb. in carload and larger lots, with an advance of 5c. per 100 lb. for less than carload, f.o.b. Pittsburgh.

Merchant Steel.—Orders continue only for small lots for actual needs, but it is expected that shortly after July 1 some of the implement makers will come in the market with their season contracts. It is understood that several mills are prepared to guarantee prices against decline in the event of such contracts being placed. The demand for Shafting is dull, the reduction in prices some time ago not having stimulated business. We quote Cold Rolled Shafting, on contracts for 100 tons and over, 57 per cent. off; carloads, 56 per cent. off, and less than carloads, 52 per cent. off, on which carload freight is allowed within base territory. Nominal prices on Merchant Steel are as follows: Smooth Finished Machinery Steel, 1.80c. to 1.90c.; Flat Sleigh Shoe, 1.75c. to 1.85c.; Cutter Shoe Steel, 2.15c. to 2.25c.; Toe Calk, 2.10c. to 2.15c.; Railroad Spring Steel, 1.60c. to 1.75c., the higher price being for Pennsylvania Railroad analysis. Carriage Spring Steel is 1.80c.; Tire Steel, Iron, finished, 1 1/2 in. and wider, 1.60c.; under 1 1/2 in., 1.75c. Planished Tire Steel is 1.80c., all f.o.b. at mill.

Pipes and Tubes.—This trade is showing steady improvement in the demand, and the reaffirming of prices by the Steel interests on May 21 is expected to bring out a good deal of tonnage that was being held back, waiting to see whether there would be any change. Some heavy contracts for Pipe line work are in prospect. It is reported that the Hope Natural Gas Company will be in the market soon for 400 miles of 16 or 18 in. Line Pipe, while a Western oil interest is reported to be inquiring for 400 miles of 8 to 10 in. Line Pipe. Prices are guaranteed by the mills against decline up to June 30, and we can state positively there will be no reduction in prices on July 1 as reported. Net discounts on Steel Pipe to the large trade on 3/4 to 6 in. remain at 74 and 5 per cent. off list, while on Iron Pipe the absolute minimum is 72 and 5 per cent. Discounts on Steel Pipe are as follows.

Merchant Pipe.

Jobbers, carloads.
Steel

Black. Galv.

	Black.	Galv.
1/8 to 1/4 in.....	.65	.49
3/8 in.....	.67	.53
1/2 in.....	.69	.57
3/4 to 6 in.....	.73	.63
7 to 12 in.....	.70	.55
Extra strong, plain ends:		
1/8 to 3/8 in.....	.58	.46
1/2 to 4 in.....	.65	.53
4 1/2 to 8 in.....	.61	.49
Double extra strong, plain ends:		
1/2 to 8 in.....	.54	.43

Discounts on Genuine Iron Pipe are as follows:

Black. Galv.

	Black.	Galv.
1/8 to 1/4 in.....	.63	.51
3/8 in.....	.65	.53
1/2 in.....	.67	.55
3/4 to 6 in.....	.71	.61
7 to 12 in.....	.68	.53
Extra strong, plain ends:		
1/8 to 3/8 in.....	.56	.44
1/2 to 4 in.....	.63	.51
4 1/2 to 8 in.....	.59	.47
Double extra strong, plain ends:		
1/2 to 8 in.....	.52	.41

Boiler Tubes.—Only scattering orders are being placed for carloads and less quantities, and no improvement can be

expected in the demand until the boiler shops get more work, and until the railroads commence to place orders. Regular discounts on Merchant Tubes in small lots, on which an extra 5 per cent. is allowed in carloads, are as follows:

Boiler Tubes.	Iron.	Steel.
1 to 1 1/4 in. ....	.42	.47
1 1/4 to 2 1/4 in. ....	.42	.59
2 1/4 in. ....	.47	.61
2 1/4 to 5 in. ....	.52	.65
6 to 13 in. ....	.42	.59
2 1/4 in. and smaller, over 18 ft. long, 10 per cent. net extra.		
2 1/4 in. and larger, over 22 ft. long, 10 per cent. net extra.		

Iron and Steel Scrap.—In addition to buying 30,000 to 35,000 tons of Pig Iron, the American Steel Foundries has been a large purchaser of Heavy Steel Scrap, having bought 12,000 to 15,000 tons for delivery at its Alliance, Ohio, plant, prices ranging from \$13.50 to \$14, delivered. In a general way, the Scrap trade is showing betterment, consumers having come to the conclusion that prices are probably as low as they will go, and that it is a good time to cover. Some dealers are not anxious to sell at present prices, but are holding their Scrap, believing the market will be higher by July 1 or shortly after. Dealers quote about as follows per gross ton: Heavy Steel Scrap, Pittsburgh, Steubenville or Sharon delivery, \$13 to \$13.25; Cast Borings, \$7.25 to \$7.50; No. 1 Railroad Wrought, \$13.25 to \$13.50; No. 1 Cast, \$13.75 to \$14; Bundled Sheet Scrap, \$8.50 to \$9, at shipping point; Sheet Bar Crop Ends, \$16 to \$16.50; No. 1 Busheling Scrap, \$12 to \$12.25; No. 2, \$9 to \$9.25; Iron Axles, \$19 to \$19.50; Steel Axles, \$16.50 to \$17; Low Phosphorus Melting Stock, \$17 to \$17.50; Old Steel Rails, short pieces for Open Hearth use, \$12.75 to \$13; Re-rolling Rails, lower in price, \$13.50 to \$13.75; Machine Shop Turnings, \$8 to \$8.25; Grate Bars, \$12 to \$12.50; Railroad Malleable Scrap, \$11.25 to \$12.

Coke.—While no actual improvement in demand can be reported for Furnace Coke, there is a prospect of better business, as a number of blast furnaces that are now idle have figured on going in blast. The Shenango Furnace Company has started up in full its Coke works at Wilpen, Pa., and several other producers are getting their ovens ready for operation. Connellsville Furnace Coke for prompt shipment is still being offered as low as \$1.50, at oven, but on contracts running over the last half of the year from \$1.60 to \$1.75 is quoted. Foundry Coke ranges from \$2 to \$2.25, at oven, depending on quality. Outside makes of Furnace Coke are quoted as low as \$1.30, and Foundry as low as \$1.75, at oven. The output of Coke last week was 173,082 tons, practically the same as the previous week.

Philadelphia.

PHILADELPHIA, PA., May 26, 1908.

The market shows further signs of strength, the buying movement in Pig Iron being maintained, with sales heavier than at any time so far this year. Consumers show more disposition to enter the market, and in many instances show their willingness to make purchases for at least part of their requirements for the last half of the year and occasionally for deliveries extending into the first quarter of next year. In this respect, however, the views of sellers are more conservative and less disposition is shown to take business for forward delivery. Speculative interests are giving the market some attention, and we understand that some pretty fair sized lots have been taken with the view of holding them for a rise early in the fall. Notwithstanding the pretty general opinion in the trade that manufacturers of finished and semifinished materials would at the New York committee meetings made an adjustment of prices, nothing was done. It was considered that in view of the lowered price of Pig Iron some shading of the price of at least some of the various classes of finished materials would result, but makers, on the other hand, contended that a reduction in price would, under the existing condition of general business, bring out no great tonnage of orders, and, as the cost of production was high, prices should be maintained. It looks, therefore, as if present prices would prevail at least during the summer months.

Pig Iron.—Sales the past week have again aggregated quite a large tonnage, and sellers in some cases are getting close to all the business they want for early shipment. With the reduced productive capacities that have prevailed the past few months, the amount of business that could be taken without blowing in additional furnaces is limited, and there is no disposition shown to increase the output at the prevailing selling prices. Sellers in a number of cases practically refuse to quote on deliveries for extended periods, and some will not take orders for delivery beyond September 1, nor will they take heavy tonnages for delivery during the next 60 or 90 days. Buyers on the other hand seem more anxious to do business, and inquiries for deliveries over the entire last half and even for early 1909 delivery are numerous. In a number of cases firm offers have been made by buyers for good tonnages for delivery the last half of the year, at prices ranging from \$1 to \$2 under the market, but they receive no attention from sellers. Prices, it is pretty generally believed, are

at the bottom, and in a number of cases are now below actual cost. The ruling price for the standard grades of Northern No. 2X Foundry Iron seems to be pretty well established, at \$16.75 to \$17.25, for deliveries in this territory. Some furnaces which cannot meet these figures are holding for higher prices, but do practically no business, while it might be possible, in the case of less well-known irons, or off grades, to shade these prices slightly for spot shipment. The bulk of the business transacted has been done in the Foundry grades. No. 2X and No. 2 Plain have been sold in tonnages ranging from 100 to 1000 for delivery the next four months. A sale of 1500 tons and another of 1000 tons of No. 2X at \$16.75, delivered, are noted. Pipe makers have been in the market for moderate quantities, particularly for low grade irons, which appear to be somewhat scarce in the Northern brands. A sale was reported, however, of a lot of 2000 tons of mixed numbers for early shipment at \$15.25, delivered. Southern Iron has not been extensively sold. Some small lots of No. 2X Foundry were done on a basis of \$11.50, Birmingham, and although firm offers have been made for good tonnages at slightly lower figures, sellers refuse to entertain them; in fact, several interests refuse to take orders for forward shipments, and have marked up their price 50c, a ton for delivery beyond September 1. Forge Iron has been in better demand. One seller reports sales aggregating 3000 tons in the past 10 days, all of which was sold around \$15.25, delivered. Inquiry from the local consumers of Basic Iron has not been heavy, although some disposition is being shown to enter the market at the prevailing price, so as to even up on the high priced Iron still to come in. One small lot of off Basic was reported sold at close to \$16, delivered. A sale of a small tonnage of Low Phosphorus Iron was reported at \$21.25. This grade has not been in urgent demand. Prices are unchanged. Some sellers ask 50c. advance over ruling figures for deliveries covering the last half of the year, but the following quotations are named for delivery in buyers' yards, eastern Pennsylvania and adjoining territory, during the next 30 or 60 days:

Eastern Pennsylvania, No. 2 X Foundry.....	\$16.75 to \$17.25
Eastern Pennsylvania, No. 2 Plain.....	16.25 to 16.75
Virginia, No. 2 X Foundry.....	17.00
Virginia, No. 2 Plain.....	16.50 to 16.75
Gray Forge.....	15.25 to 15.50
Basic.....	16.00 to 16.25
Low Phosphorus.....	21.00 to 21.50

Ferromanganese.—There has been more inquiry for small tonnages for delivery the last half of the year, although the amount of business done has been small. Prices are stationary, some sellers quoting \$44 to \$45, for early delivery, others still holding at \$46, Baltimore.

Steel.—More inquiry has developed for Billets. Buyers are feeling the market with the hope of finding lower prices, but makers are firm, since the recent determination to maintain prices. Sales have been light, but producers feel more encouraged and expect business heretofore deferred to come out before a great while. Prices are unchanged. For delivery in this territory ordinary Rolling Steel is quoted at \$20.30, with Forging Steel at \$31.20, subject to the usual extras for high carbons and special sizes.

Plates.—The determination to maintain prices has resulted in the bringing out of some business, which had been held up pending the action of the manufacturers, and it is expected that orders will now be placed more freely. Inquiries are on the market for Steel for boilers, cars and tanks, which aggregate quite a good tonnage. The Maryland Steel Company has orders for harbor work for the city of Baltimore, which will require 2400 tons of Plates. Most of the business taken by the local mills has been small, but the trade feels much encouraged regarding future business:

	Carload. Cents.	Part carload. Cents.
Tank, Bridge and Boat Steel.....	1.85	1.90
Flange or Boiler Steel.....	1.95	2.05
Commercial Firebox.....	2.05	2.10
Marine.....	2.25	2.30
Locomotive Firebox Steel.....	2.35	2.40
The above are base prices for 3/4-in. and heavier. The following extras apply:		
3-16-in. thick.....	\$0.10	
Nos. 7 and 8, B. W. G.....	.15	
No. 9, B. W. G.....	.25	
Plates over 100 to 110 in.....	.05	
Plates over 110 to 115 in.....	.10	
Plates over 115 to 120 in.....	.15	
Plates over 120 to 125 in.....	.25	
Plates over 125 to 130 in.....	.50	
Plates over 130 in.....	1.00	

Structural Material.—A moderate increase is to be noted in the demand for Structural Material, and mills make slight gains from week to week. Orders are mostly small, although inquiries for larger lots are more numerous. As it has now been definitely decided that there will be no change in prices, it is believed that less hesitancy will be displayed in placing business. Prices continue to be quoted from 1.85c. to 2c., according to specifications.

Sheets.—No change is to be noted in the demand for Sheets. There has been a little better inquiry, but the tonnage of business taken has hardly been up to that of the

previous week. Some buyers show a disposition to buy for forward delivery, but the purchases made are not large. For mill shipments quotations range as follows, a tenth extra being added for small lots: Nos. 18 to 20, 2.50c.; Nos. 22 to 24, 2.60c.; Nos. 25 to 26, 2.70c.; No. 27, 2.80c.; No. 28, 2.90c.

Bars.—The Eastern Bar Iron Association, at its recent meeting in New York City, reaffirmed the base price of 1.50c., Pittsburgh, for Refined Iron Bars. Very little business is coming out at this figure, however, there being enough low price contracts around to supply the current demand. New business is light and specifications on old orders are meager. For prompt shipment Refined Iron Bars can be had for delivery in this territory at prices ranging from 1.45c. to 1.55c. Some of the Eastern mills are giving more attention to the rolling of Steel Bars, and some small business has been done in that direction at 1.75c., delivered.

Coke.—The amount of new business has not been large. Some little buying has been done in Foundry Coke, but the demand for Furnace Coke is quiet. Some producers are a little firmer on prices, but no quotable change is to be noted. Foundry Coke ranges from \$2.15 to \$2.35, at oven, while Furnace Coke is quoted at \$1.60 to \$1.75, at oven. For delivery in this territory the following range of prices is quoted:

Connellsville Furnace Coke.....	\$3.75 to \$3.90
Foundry Coke.....	4.30 to 4.50
Mountain Furnace Coke.....	3.35 to 3.50
Foundry Coke.....	3.90 to 4.10

Old Material.—A little more activity has developed in the Old Material market. Mills continue to pick up small tonnages for prompt delivery of the different grades of Scrap, and prices are a little firmer in some grades. A sale of 1300 tons of Low Phosphorus Scrap is reported at \$17.50, at mill. Heavy Melting Steel is stronger, a sale of 100 tons being noted at \$13.50, delivered. Turnings and Borings have been a little more active at unchanged prices. Quotations are largely nominal, ranging about as follows for prompt shipment, eastern Pennsylvania and adjoining territory:

No. 1 Steel Scrap and Crops.....	\$13.00 to \$13.50
Low Phosphorus.....	17.50 to 18.00
Old Steel Axles.....	18.00 to 18.50
Old Iron Axles.....	20.00 to 21.00
Old Iron Rails.....	18.00 to 18.50
Old Car Wheels.....	14.00 to 15.00
Choice No. 1 R. R. Wrought.....	15.00 to 15.50
Machinery Cast.....	14.50 to 15.00
Wrought Iron Pipe.....	11.50 to 12.00
No. 1 Forge Fire Scrap.....	11.50 to 12.00
No. 2 Light Iron.....	9.00 to 10.00
Wrought Turnings.....	9.50 to 10.00
Stove Plate.....	11.00 to 11.50
Cast Borings.....	8.50 to 9.00
Grate Bars.....	11.75 to 12.25

St. Louis.

ST. LOUIS, Mo., May 23, 1908.

The feature of the situation is the marked improvement in the demand for Pig Iron, and this, in turn, has brought about a firmer general market. In the term demand reference is had both to actual sales and to price or delivery inquiries. While sales of Structural Material are moderate a season of greater activity is near at hand, as contractors are about to place orders for some of the large structures which have been determined upon.

Coke.—Shipments on contract are coming forward more freely and a larger number of inquiries are pending. The current figures are \$2 to \$2.25, f.o.b. oven, the lower price for immediate shipment and the higher on contract.

Pig Iron.—In case of a local agency recent sales of Pig Iron up to date, including those already reported, foot up to 20,000 tons, mostly Basic. Inquiries are pending for 5000 tons of Malleable Bessemer, 5000 tons of Basic and between 3000 and 5000 tons of Southern Foundry for shipment over the balance of the year. Prices are firm at \$11.50, Birmingham, for No. 2, with one of the largest interests advancing this figure to \$12.

Finished Iron and Steel.—Brokers report a better demand than at any time during the past two months, mainly local, though some orders are coming from outside points, principally from the smaller railroads. The local call is most pronounced for Steel foundry products for railroad purposes. Light Rails are in better demand, but prices continue to rule low.

Old Materials.—The market for Old Materials is ruling steady and quiet. There is but one list out, that of the Cotton Belt Line, which is offering 600 tons. In Heavy Melting Steel the activity noted last week has not been in evidence, owing to dealers having supplied their wants. No sales of consequence are reported. There is a continued inquiry for Relaying Rails and considerable business would result were the prospective buyers able to meet holders' ideas as to terms of payment. On the whole, the market is firmer and the outlook improving. We quote, f.o.b. St. Louis, per gross ton, as follows:

Old Iron Rails.....	\$14.00 to \$14.50
Old Steel Rails, rerolling.....	11.25 to 11.50
Old Steel Rails, less than 3 ft.....	11.00 to 11.25
Relaying Rails, standard sections, subject to inspection.....	22.50 to 23.50
Old Car Wheels.....	11.50 to 12.00
Heavy Melting Steel Scrap.....	10.75 to 11.00
Frogs, Switches and Guards, cut apart.....	10.50 to 11.00
Mixed Steel.....	9.00 to 9.50

The following quotations are per net ton:

Iron Fish Plates.....	\$11.50 to \$12.00
Iron Car Axles.....	14.50 to 15.00
No. 1 Railroad Wrought.....	10.75 to 11.00
No. 2 Railroad Wrought.....	8.50 to 10.00
Railway Springs.....	9.00 to 10.00
Locomotive Tires, smooth.....	12.00 to 12.50
No. 1 Dealers' Forge.....	9.50 to 10.00
Mixed Borings, &c.....	3.50 to 3.75
No. 1 Boilers, cut to Sheets and Rings.....	7.00 to 8.00
No. 1 Cast Scrap.....	10.00 to 10.50
Stove Plate and Light Cast Scrap.....	9.00 to 9.50
Railroad Malleable.....	9.25 to 9.75
Agricultural Malleable.....	8.50 to 9.00
Pipes and Flues.....	7.25 to 7.50

Sealed proposals for public work will be received by the St. Louis Board of Public Improvement until June 5 as follows:

For furnishing materials and tools for constructing a conduit line, Steam and return Pipes, Hot and Cold Water Pipes and Air Pipes, with all necessary Manholes and Anchors, for the steam heating system at Quarantine Hospital.

For furnishing materials and tools for the erection of two new Boilers and Boiler settings for the Quarantine Hospital.

Cleveland.

CLEVELAND, OHIO, May 26, 1908.

Iron Ore.—The market shows no indication of taking on any life. The resale of a few small lots on the docks are reported, but no sales of this year's Ore were made, and a general buying movement does not seem near at hand. A few furnace interests will have to come into the market soon for some Ore to mix with what they now have in their furnace yards, but this demand will be only for a limited tonnage. Ore men, however, are watching with considerable interest the present buying movement in Pig Iron, and they believe that if it continues any length of time it will start an active buying of Ore. The first Ore shipped by the Steel Corporation this season reached Lake Erie ports yesterday. About half a dozen boats of the Pittsburgh Steamship Company have loaded with cargoes, which will be unloaded before the end of the week. With the exception of two cargoes all the Ore shipped so far this season has been by furnace interests owning their own Ore properties, and the total May shipments will probably not be much over 100,000 tons as compared with 5,600,000 the corresponding month last year. With the absence of sales there is no inquiry for vessel tonnage in the Ore trade, although a little wild chartering has been done for shipment from the head of the lakes to Tonawanda at 70c., the same as last year. There will be little Ore for shipment at least the first half of June, and it is probable that the general start in lake navigation which was postponed until June 1 will be put off until a later date. Ore shipments from the docks to the furnaces are still light, the movement being less than a month ago. Ore prices are being firmly maintained. Prices for 1908 delivery at Lake Erie docks, per gross ton, are as follows: Old Range Bessemer, \$5; Mesaba Bessemer, \$4.75; Old Range non-Bessemer, \$4.20; Mesaba non-Bessemer, \$4; Siliceous Bessemer, \$2.75; Siliceous non-Bessemer, \$2.35 to \$2.60.

Pig Iron.—The activity in the Pig Iron market which started two weeks ago has continued the past week, with a largely increased volume of inquiries for Foundry Iron for spot, third quarter and last half delivery. A large share of the inquiries are for small lots, ranging from 50 to 200 tons, but there are several larger ones, among them an inquiry for 5000 tons from the International Steam Pump Company. There has also been considerable activity in the Basic Iron market, one furnace interest reporting seven inquiries aggregating about 15,000 tons. Considering the large number of inquiries for Foundry Iron the sales during the week have not been numerous. One local interest with furnaces in western Pennsylvania and New York reports the sale of 4000 tons of Foundry Iron for prompt shipment at an average price of about \$15, at furnace, for No. 2. Included in this tonnage was one lot of No. 1 Iron that was sold on the basis of \$15.30, Valley furnace. Another local interest sold about 2000 tons of No. 2 at \$14.75 to \$15, Valley furnace, for third quarter delivery. Other sales in the local market will aggregate not over 1000 tons, none being made by interests that have been holding for prices higher than those that have been prevailing. The market is slightly firmer as a result of the increased inquiries, and some furnaces are asking about 50c. a ton more than a week ago, although there are still reports of sales at \$14.50, Valley furnace, for No. 2. Local furnaces are now holding at \$15.75 to \$16, for spot, third quarter and last half delivery in this territory, for No. 2. A local foundry made an offer of \$14.50 for 1000 tons

of No. 2 for last half delivery, but the offer was rejected by a local furnace. There is a difference of opinion among furnacemen as to whether the present activity is only a spurt or whether the improvement in the market will continue. While the present inquiries would no doubt result in considerable buying at prices around \$14.50 and \$14.75, Valley furnace, consumers seem unwilling to buy at higher prices. The Southern Iron market is slightly firmer, and one leading producer, who is still quoting No. 2 at \$11.50, Birmingham, for delivery until July 1 is now asking \$12 for the third quarter. There is practically no inquiry for Malleable or Bessemer Iron. The Foundry Iron melt in this territory shows a little improvement. For prompt shipment, and for third quarter we quote, delivered, Cleveland, as follows:

Bessemer	\$16.90
Northern Foundry No. 1.....	\$15.90 to 16.40
Northern Foundry, No. 2.....	15.40 to 16.00
Northern Foundry, No. 3.....	15.00 to 15.50
Southern Foundry, No. 2.....	15.85 to 16.35
Gray Forge.....	14.90

Coke.—There is a fair demand for Foundry Coke for the last half, and some inquiry for Furnace Coke. Prices remain about stationary. We quote Connellsville Furnace Coke at \$1.50 to \$1.60, at oven, for spot shipment, and 72-hr. Foundry Coke at \$2 to \$2.25, at oven, the latter price being held for last half delivery.

Old Material.—While the market is still dull a better feeling seems to prevail among dealers, and signs of further weakness have disappeared. Some inquiry for Steel Scrap from the Pittsburgh District has made the market slightly firmer, as far as Steel Scrap is concerned, and dealers are trying to buy it at to-day's prices for future delivery. The local demand for Scrap shows no improvement. The mills are running only part of the time and are buying very little. The demand for Cast Scrap is also light. Steel Scrap is somewhat firmer, but all price quotations, which are still largely nominal, are unchanged. Dealers' prices to the trade per gross ton, f.o.b. Cleveland, are as follows:

Old Steel Rails.....	\$11.00 to \$11.50
Old Iron Rails.....	14.50 to 15.50
Steel Car Axles.....	16.00 to 17.00
Old Car Wheels.....	12.50 to 13.00
Relaying Rails, 50 lb. and over.....	21.00 to 22.00
Heavy Melting Steel.....	11.00 to 11.50
Railroad Malleable.....	11.00 to 11.50
Agricultural Malleable.....	10.50 to 11.00
Light Bundled Sheet Scrap.....	7.50 to 8.50

The following quotations are per net ton, f.o.b. Cleveland:

Iron Car Axles.....	\$16.00 to \$16.50
Cast Borings.....	5.00 to 5.50
Iron and Steel Turnings and Drillings..	6.00 to 6.25
Steel Axle Turnings.....	7.50 to 8.00
No. 1 Busheling.....	10.00 to 10.50
No. 1 Railroad Wrought.....	11.00 to 12.00
No. 1 Cast.....	11.50 to 12.50
Stove Plate.....	10.00 to 10.50
Bundled Tin Scrap.....	8.00 to 9.00

Finished Iron and Steel.—The volume of business in Finished lines remains about stationary, there being no improvement in orders or specifications. Buying is all in small lots for immediate needs. Some consumers have been holding off in the hope of getting lower prices. The action of the leading Steel interests in reaffirming prices at their meeting in New York last week is expected to stimulate buying slightly, but that effect is not yet noticeable. Consumers, as a rule, have allowed their stocks to become low, but they are expected to continue for the present the policy of buying in small lots. The demand for both Iron and Steel Bars is still light. The local Bar Iron mills are running this week but with only a small tonnage on their books. Jobbers are still cutting the price of Iron Bars to 1.40c., Pittsburgh, and it is reported that one mill is offering Steel Bars at 1.50c., Pittsburgh. The demand for Plates shows no improvement. A local mill reports that its Light Plate orders are only for small lots for quick shipment. Prices are weak and there are reports of shading of \$2 a ton on Heavy Plates as well as on Light Plates. The demand for Sheets is light and price concessions of \$1 to \$2 a ton are being made on Black and Galvanized Sheets. No contracts have been made as yet by the agricultural implement makers for Steel Bars for the year beginning July 1, but some inquiries have been received from these consumers and it is expected that they will begin placing orders the coming month. The implement men have been doing a good volume of business the present year, not being seriously affected by the depression, and in view of the good crop prospects it is expected that their requirements for the coming year will be as large as ever. The Structural outlook remains unsatisfactory, although one mill reports some improvement in this line. The warehouse business of jobbers for May will show up better than for April, but their mill business will not be so large. We quote Iron Bars at 1.50c. to 1.60c., Cleveland, for car lots; Steel Bars, 1.70c., Cleveland, for car lots, half extras; Beams and Channels, 1.80c., base, Cleveland, and Plates, ¼ in. and heavier, 1.80c., Cleveland. Dealers quote Sheets, mill shipments, car lots, Cleveland, as follows: Blue Annealed, No. 10, 1.90c.; Box Annealed, No. 28, 2.60c.; Galvanized, No. 28, 3.65c. Warehouse prices are unchanged. Jobbers quote Iron and Steel Bars out of stock at 1.70c. to 1.80c.; Beams and Channels

out of stock are 2.10c. to 2.15c. Warehouse prices on Sheets are as follows: Blue Annealed, No. 10, 2.10c.; Box Annealed, No. 28, 2.70c.; Galvanized, No. 28, 3.85c. Warehouse prices on Boiler Tubes, 2¾ to 5 in., are 64 per cent. discount, and on Black Merchant Iron Pipe, base sizes, 67 per cent. discount.

Cincinnati.

CINCINNATI, OHIO, May 27, 1908.—(By Telegraph.)

Transactions in Pig Iron have constituted the principal feature in the Iron and Steel market, and all auxiliary interests have apparently profited thereby, even the Tool manufacturers, who regard Pig Iron as the barometer of trade and its lead as prophetic of early conditions. The location here of a new rolling mill plant and the visits and correspondence of others contemplating the institution of new industries in the Iron and Steel trade have encouraged allied industries, and the feeling in this center is optimistic to a degree. For the first time in some months the jobbing foundries are buying Iron, and there have been several contracts made of 1000 to 2000 ton lots each, and practically all Southern. In Finished Material the decision to hold prices at the New York meeting seems to have had a stimulating effect, and stores and large selling agencies are getting some carload orders, where the buying for several months has been of the strictly hand to mouth character. In Scrap the bottom seems finally to have been struck in this market, which has reached the lowest levels for many months.

Pig Iron.—Conditions in the large selling offices to-day reminded one somewhat of the prosperous times of early 1907. There have been some large sales of Iron reported, ranging from \$11 to \$12, Birmingham. While a number of interests continue to quote \$11.50 on No. 2 for early delivery, at least two of the largest Southern interests have made \$12 the minimum, at which they will take business running as late as September delivery, and others announce that the quoted price of \$11.50 to-day is subject to the condition of order books, and liable to be withdrawn at the shortest notice. A large quantity of Basic has been sold through this market the past week, and there are several inquiries out for more. The scarcity of low grades is still as marked as in our last report, and several agencies report inability to fill orders, hence for this reason a price is difficult to obtain. An interesting feature of the week's buying in the local market has been on account of the jobbing foundries, one melter, and not the largest in the district, taking 1500 tons of No. 2 Foundry for delivery extending over one year from June 1 at \$11.50, Birmingham; another 2000 tons, another 1200 and another 1000, the majority asking for delivery through the last half. A characteristic of Foundry buying in this territory is the disposition of the entire trade to get into the market at once. Two hundred tons of Mottled sold at about the basis of Forge, \$10.25, Birmingham. The American Seeding Machine Company, Springfield, Ohio, is reported to have bought 2000 tons of Nos. 2 and 3 Foundry at about \$11, Birmingham basis, on No. 2. A report is received here that all the Valley furnaces have stiffened on prices, as have also the central Ohio interests accredited with placing some good business at shaded figures early in the start of the activity. A large St. Louis interest is out with an inquiry for Open Hearth Basic, 5000 to 15,000 tons, for delivery the last quarter and first of next year. A central Ohio Steel maker wants 3000 tons of Basic, covering the last four months. Another in about the same territory wants 1000 tons a month over the last half. A northern Ohio Steel making concern asks for 250 to 500 tons for June and July. There are inquiries here for about 20,000 tons from the agricultural implement makers alone, and the stove makers are also buying some Iron. Little is heard yet of Northern Iron, although a furnace in the Wellston District, is reported to have withdrawn all quotations under \$17 for the last quarter. Most quotations to-day are on the basis of \$16, at furnace, although it is reported that \$15.50 is still being done by certain interests. Ohio Silveries are firm at \$18.50, at furnace, for 8 per cent. For early delivery and extending into the third quarter we quote, f.o.b. Cincinnati, as follows: Freight rates being \$3.25 from Birmingham, and \$1.20 from the Hanging Rock District:

Southern Coke, No. 1.....	\$15.25 to \$15.75
Southern Coke, No. 2.....	14.75 to 15.25
Southern Coke, No. 3.....	14.25 to 14.75
Southern Coke, No. 4.....	14.00
Southern Coke, No. 1 Soft.....	15.25 to 15.75
Southern Coke, No. 2 Soft.....	14.75 to 15.25
Southern Coke Gray Forge.....	13.75
Ohio Silvery, 8 per cent. Silicon.....	19.70
Lake Superior Coke, No. 1.....	17.20 to 17.70
Lake Superior Coke, No. 2.....	16.70 to 17.20
Lake Superior Coke, No. 3.....	16.20 to 16.70
Standard Southern Car Wheel.....	22.25 to 22.75
Lake Superior Car Wheel.....	22.00 to 22.50

(By Mail.)

Coke.—Little change is seen in the situation with reference to spot Coke, although some contracting is noted on forward business, which is regarded by local selling factors as likely now to improve, gradually keeping pace with the im-

proved demand for Iron. One agency has made a couple of good sized contracts covering a period of one year beginning on July 1 for Foundry Coke, but not in Cincinnati territory. The price is reported to be in the neighborhood of that prevailing for shorter contract periods, namely, \$2 to \$2.25, at oven. On Furnace grades there is little or no improvement, although it is expected if the demand for Iron continues there will be some contracting. The ruling price is about \$1.50 to \$1.60, at oven. Connellsville best brands are quotable at \$1.65 to \$1.80, at oven; New River Furnace grades at \$2.25. Best grades of Foundry Coke are obtainable for immediate delivery at \$2; New River at \$2.75. Pocahontas Furnace Coke is quoted by one agency at \$1.90; Connellsville, \$1.70 to \$2.

Finished Iron and Steel.—Dealers report a trifle more business coming out in number of orders, but still lament their insignificant size. Within the past few days there have been some good inquiries from Ohio points for Structural Material, one being for 500 tons. There is a universal denial that prices have shown any retrogression on any line, and the larger dealers do not expect any recessions in the light of the recent agreements in New York City. Orders from stock are filled at the following prices, which are f.o.b. Cincinnati: Iron Bars, carload lots, 1.65c., base, with half extras; small lots from store, 1.85c., base, half extras. Steel Plates, carload lots, 1.75c., base, half extras; small lots from store, 1.85c., base, half extras. Base Angles, carload lots, 1.85c., base; small lots from store, 2.10c. Beams, Channels and Structural Angles, 1.85c., base; small lots from store, 2.10c. Plates, 1/4-in. and heavier, carload lots, 1.85c.; small lots from store, 2c. Blue Annealed Sheets (Heavy), No. 16, carload lots, 2.15c.; small lots from store, 2.50c. No. 14, carload lots, 2.05c.; small lots from store, 2.40c. No. 10 and heavier, carload lots, 1.95c.; small lots from store, 2.20c. No. 12, carload lots, 2c.; small lots from store, 2.30c. Sheets (Light), Black, No. 28, carload lots, 2.65c. Galvanized Sheets, No. 28, carload lots, 3.70c. Steel Tire, 4-in. and heavier, carload lots, 1.95c. Plates, 3-16 and No. 8, carload lots, 2c.; small lots from store, 2.20c.

Old Materials.—No transactions of any size are reported by the Scrap dealers in this market, although sentimentally the feeling is more optimistic. Steel Scrap is stronger, there being a little more demand, while rolling mill Scrap remains inactive. The good weather has seemingly stimulated the movement a little. The larger dealers who have been buying steadily during the months of depression have taken over the miscellaneous stocks of a number of small dealers, so that the business in this territory will be less divided than in times past. Prices have not changed since last week, and we quote for delivery, Cincinnati, as follows:

No. 1 Railroad Wrought, net ton.....	\$10.50 to \$11.50
Cast Borings, net ton.....	4.00 to 5.00
Heavy Melting Steel Scrap.....	11.00 to 12.00
Steel Turnings, net ton.....	5.00 to 6.00
No. 1 Cast Scrap, net ton.....	10.25 to 11.25
Burnt Cast and Wrought, net ton.....	8.00 to 9.00
Old Iron Axles, net ton.....	14.50 to 15.50
Old Iron Rails, gross ton.....	13.00 to 14.00
Old Steel Rails, long, gross ton.....	11.00 to 12.00
Old Steel Rails, short, gross ton.....	11.00 to 12.00
Relaying Rails, 56 lb. and up, gross ton.....	22.00 to 23.00
Old Car Wheels, gross ton.....	12.00 to 13.00
Low Phosphorus Scrap, gross ton.....	13.00 to 14.00

New York.

NEW YORK, May 27, 1908.

Pig Iron.—There has been a considerable tonnage placed during the past week, at prices which were lower than those ruling recently. An increased number of sellers showed determination to meet the market, and the great majority of buyers have taken an interest. The result has been that Pipe makers, Stove founders, Malleable Iron founders and machine shops have purchased, the tonnage in the aggregate being quite large. The buying extended over this territory and over New England, where Buffalo furnaces have for the first time in a long while been active sellers. Basic Pig Iron has sold at \$15.50, delivered in eastern Pennsylvania. We quote Northern No. 1 Foundry, tidewater, \$16.75 to \$17; No. 2 Foundry, \$16 to \$16.50, and No. 2 Plain, \$15.50 to \$16. Alabama Irons are selling at \$16 to \$16.50 for No. 1, and \$15.25 to \$15.75 for No. 2.

Steel Rails.—The Erie Railroad, which is following a policy of hand-to-mouth buying, has placed an order for 2000 tons of Rails in the past week, early shipment being called for. Generally, the Rail situation is uninteresting, with no apparent likelihood of an early change for the better.

Structural Material.—The mills are running on less than half time, though the general sentiment is that the activity in structural work and the promise of construction projects that have been figured on recently give this department of the market a better position than that of other lines. The month of May is expected to show a total of fabricating contracts closed in excess of 50,000 tons, an important part of which was placed in the past week. The McClintic-Marshall Construction has taken the large business of the week, including the Pittsburgh & Lake Erie Railroad bridge over

the Ohio at Beaver, Pa., 13,500 tons, the new Lackawanna shops at Scranton, Pa., 5000 tons, and a warehouse at Philadelphia, 1000 tons. In the territory tributary to Chicago, about 16,000 tons of structural work has been let in the last 10 days. The Queen & Crescent bridge, calling for 5000 tons, is still pending, as is the Horne Building, Pittsburgh, which will take 3000 tons. The American Bridge Company has the contract for 750 tons for the new State University Library, at Berkeley, Cal. It has also closed for 400 tons of bridge work for the Florida East Coast and for small bridges for the New Haven Road and the Duluth, Mesaba & Northern. In New York the Public Service Commission has awarded contracts for the construction of five of the six sections of the Fourth avenue subway in Brooklyn, at an aggregate of \$14,764,510, but there are a good many contingencies, and it may be a long time before the mills will hear from this action. Bids will be taken this week on the new Borough Hall in Brooklyn, the Steel amounting to several hundred tons. The Frederick Loeser & Co. store in Brooklyn, which would have required about 1500 tons for the Steel cage construction at first figured on, will be built of reinforced concrete, and only 300 to 400 tons of Steel will be needed. We continue to quote on mill shipments, tide-water delivery, as follows: Beams, Channels, Angles, and Zees, 1.86c.; Tees, 1.91c. On Beams, 18 to 24 in., and Angles over 6 in., the extra is 0.10c. Material cut to length is sold from stock at 2 1/4c. to 2 1/2c.

Ferroalloys.—The demand for 80 per cent. Ferromanganese continues of good proportions, and although orders the last week have not been as large as in the preceding one, they have been more numerous, and the tonnage disposed of about the same. Prices are firmer, ranging from \$45 to \$47, Baltimore. There are no stocks of Ferromanganese anywhere, and the larger consuming interests have not yet begun to buy. Some improvement is noted in the demand for 50 per cent. Ferrosilicon, but it can still be had at \$75, and the real buying has not yet set in. Furnace Grade has recently been taken in preference to the high percentage on account of price.

Bars.—The Eastern Bar Iron manufacturers held their usual monthly meeting in this city last Thursday and decided to reaffirm the price of 1.50c., Pittsburgh, or 1.66c., New York. It is understood, however, that only a limited number of manufacturers, representing the leading interests in the trade, are adhering to this price. The usual figures at which orders are being placed are 1.40c. to 1.50c., New York. The manufacturers are now at work on a plan which they hope will impart more stability to the market. The inquiry has improved considerably, buyers now negotiating for quantities which are decidedly larger than anything placed within the last month or more. Steel Bars continue to be held at 1.60c., Pittsburgh, or 1.76c., New York.

Plates.—Locally this branch of trade is in the least satisfactory condition of any. Orders are small and far apart. Local consumers of Plates appear to be doing repair work exclusively and therefore are buying but sparingly. Prices of standard sizes of Plates are continued as follows, at tide-water: Sheared Plates, 1.86c. to 1.96c.; Flange Plates, 1.96c. to 2.06c.; Marine Plates, 2.26c. to 2.36c.; Fire Box Plates, 2.75c. to 3.50c., according to specifications.

Old Material.—Dealers unite in reporting a better demand for almost all kinds of Old Material. Heavy Steel Melting Scrap appears to be in strongest demand, with sales aggregating over 5000 tons. Most of this Scrap has been sold for delivery to works in eastern Pennsylvania. The foundries are buying more freely, but so far orders coming to this market for Cast Scrap have been confined to foundries in the immediate territory. Even the rolling mills are now coming into the market to some extent, especially those which manufacture Wrought Iron Pipe. Cast Borings and Turnings are strong, as the supply continues short owing to the slackness of work among the machine shops. Relaying Rails are in some request, but buyers are looking for special weights or sections. Old Car Wheels are most neglected, the demand being slight, while the supply is exceedingly abundant. Quotations are about as follows per gross ton, New York City:

Old Girder and T Rails for melting.....	\$11.50 to \$12.00
Heavy Melting Steel Scrap.....	11.50 to 12.00
Old Steel Rails, rerolling lengths.....	11.50 to 12.00
Relaying Rails.....	20.25 to 21.25
Old Iron Rails.....	14.50 to 15.00
Standard Hammered Iron Car Axles.....	16.00 to 16.50
Old Steel Car Axles.....	14.50 to 15.00
No. 1 Railroad Wrought.....	12.00 to 12.50
Iron Track Scrap.....	10.00 to 10.50
No. 1 Yard Wrought, long.....	11.00 to 11.50
No. 1 Yard Wrought, short.....	10.00 to 10.50
Light Iron.....	5.50 to 6.00
Cast Borings.....	5.00 to 5.50
Wrought Turnings.....	6.50 to 7.00
Wrought Pipe.....	9.50 to 10.00
Old Car Wheels.....	12.00 to 13.00
No. 1 Heavy Cast, broken up.....	13.00 to 14.00
Stove Plate.....	9.00 to 10.00
Locomotive Grate Bars.....	10.00 to 10.50
Malleable Cast.....	11.50 to 12.50

Cast Iron Pipe.—The Board of Contract and Supply of Syracuse, N. Y., is advertising for proposals, to be received

until 1.30 p.m. June 1, for furnishing Cast Iron Pipe for the conduit line from Skaneateles Lake to the city of Syracuse. Bids are being received for 20,000 tons of 30 to 42 in. Pipe in quantities of 5000 tons. The city of Rome, N. Y., is also advertising for 3745 tons of 30-in., proposals to be received until 12 o'clock noon, June 10. These are the only large contracts in sight in this territory, but the general demand is considerably better. Carload buying is much more active and the disposition to purchase appears to be extending. Even the railroads are making some purchases. While it is possible to secure carload lots of 6-in. from some foundries at \$23.50 to \$24 per net ton at tidewater, most of the manufacturers are now asking an advance of at least 50c. per ton.

The New York offices of the American Spiral Pipe Works, manufacturer of Taylor's spiral riveted pipe, have been moved from 39 Cortlandt street to larger and better equipped offices in the Hudson Terminal Building, 50 Church street. F. B. Sanborn is in charge. This pipe is furnished 3 to 40 in. in diameter up to $\frac{1}{4}$ in. in thickness, and for pressures up to 500 lb.

Metal Market.

NEW YORK, May 27, 1908.

Pig Tin.—Business during the week has been of small proportions. The heaviest buying season of the year has passed, and it may be that the Tin Plate mills will not run as actively after July 1 as they have during the last month. Trade was eagerly awaiting the result of the Banca sale, which occurred Tuesday, and went at the equivalent of the low figure of 28.45c., c.i.f. New York. The arrivals so far this month have been large, amounting to 3815 tons, and there are afloat 1772 tons. Deliveries into consumption will probably be large and amount to at least 3800 tons. Price changes during the week have been toward lower levels, as follows:

	Cents.
May 20.....	30.15 to 30.30
May 21.....	29.55
May 22.....	29.60
May 25.....	29.00
May 26.....	28.95
May 27.....	28.50

The London market declined further to-day, closing at £128 5s. for spot, and £127 2s. 6d., for futures. This was caused by the announcement that shipments from the Straits for May would break all records, at 6800 tons.

Copper.—Neither domestic nor foreign consumers appear anxious to buy at present levels, although prices have receded somewhat from the figures of last week. Lake can be had at 12.87 $\frac{1}{2}$ c., while stray lots have been offered as low as 12.75c. Electrolytic is available for domestic consumption, at 12.62 $\frac{1}{2}$ c. As yet there has been no appreciable demand from speculative interests for Copper. While a little more activity is noted among consumers, the increased production now coming on the market more than offsets this. In the mining camps considerable headway has been made in reducing the cost of production. The exports continue good, amounting to 19,200 tons so far this month, but these are still considerably below the heavy exports earlier in the year. Prices abroad are about £1 lower than last week, at £56 17s. 6d., for spot, and £57 10s. for futures. The Anaconda report last week shows the stress through which Copper producers passed last year.

Spelter.—The market for Spelter is apparently more unsettled and demoralized than at any time since the October drop. Prime Western is available in the West at 4.40c. to 4.45c., and in New York at 4.55 to 4.60c. Stocks continue to accumulate.

Pig Lead.—The price of Lead has been further advanced to 4.35c., New York, but it is doubtful how much more boosting the market will stand, as there is much Lead in the hands of speculative interests bought at considerably lower figures. Should any further advance be made this is likely to come on the market, if it has not done so already. Lead in St. Louis is quoted at 4.20c. to 4.30c. All sellers are quoting the same prices.

Old Metals.—The decline in ingot Copper has frightened buyers who are now waiting to see how far it will go. Export orders continue fair. Dealers' selling prices are as follows:

	Cents.
Copper, Heavy and Crucible.....	12.00 to 12.50
Copper, Heavy and Wire.....	11.50 to 12.00
Copper, Light and Bottoms.....	10.50 to 11.00
Brass, Heavy.....	9.00 to 9.25
Brass, Light.....	7.00 to 7.50
Heavy Machine Composition.....	11.50 to 11.75
Clean Brass Turnings.....	7.50 to 8.50
Composition Turnings.....	9.50 to 10.50
Lead, Heavy.....	3.90
Lead, Tea.....	3.55
Zinc.....	3.50

Nickel.—The unchanged price of 45c. continues for ton lots, and 50c. to 60c. for smaller quantities.

Antimony.—An occasional change in the London price

is the only excitement in that trade. Prices here are unchanged, at 8.75c. to 8.87 $\frac{1}{2}$ c., for Cookson's; 8.50c. to 8.75c., for Hallett's, and 8.25c. to 8.50c., for outside brands.

Tin Plates.—Business continues good, the new orders coming in being fair. Prices are without change, at \$3.89, New York, and \$3.70, Pittsburgh, for 100 lb. IC Coke Plates. Welsh Tin Plates are 1 $\frac{1}{2}$ d. lower in Swansea, at 12s. 3d.

Iron and Industrial Stocks.

NEW YORK, May 27, 1908.

The stock market experienced quite a setback on Thursday of last week, when not only the railroad stocks, but iron and steel stocks declined quite sharply from the prices realized on the previous day. Another weak day was Saturday. Republic preferred was particularly affected, declining to 66, with rumors that the quarterly dividend might perhaps be reduced. In nearly all instances some recovery occurred, but the range of prices now prevailing is materially below that ruling 10 days ago. The range of prices on active iron and steel stocks from Thursday of last week to Tuesday of this week is as follows: United States Steel common 36 $\frac{1}{2}$ to 39, preferred 100 to 102 $\frac{1}{2}$; Car & Foundry common 35 $\frac{1}{4}$ to 37 $\frac{1}{2}$, preferred 97; Locomotive common 48 $\frac{3}{4}$ to 50 $\frac{1}{4}$, preferred 103; Steel Foundries common 6 to 7, preferred 34 to 34 $\frac{1}{2}$; Cambria Steel 30 $\frac{1}{2}$ to 31 $\frac{1}{2}$; Colorado Fuel 26 $\frac{1}{2}$ to 31 $\frac{1}{2}$; Crucible Steel common 5 $\frac{1}{2}$ to 6 $\frac{1}{2}$, preferred 42 to 42 $\frac{1}{2}$; Pressed Steel common 26 $\frac{1}{2}$ to 28 $\frac{1}{2}$, preferred 84 to 85; Railway Spring common 36 to 37; Republic common 17 to 18 $\frac{1}{2}$, preferred 66 to 69 $\frac{1}{4}$; Sloss-Sheffield common 49 $\frac{1}{2}$ to 51 $\frac{1}{2}$; Cast Iron Pipe common 27 $\frac{1}{2}$ to 28 $\frac{1}{2}$, preferred 73 $\frac{1}{2}$ to 75; Can common 5, preferred 54 $\frac{1}{2}$ to 55. Last transactions up to 1.30 p.m. to-day are reported at the following prices: United States Steel common 35 $\frac{1}{2}$, preferred 100 $\frac{1}{4}$, bonds 96; Car & Foundry common 36 $\frac{1}{2}$, preferred 97; Locomotive common 47 $\frac{3}{4}$, preferred 103; Colorado Fuel 26; Pressed Steel common 27, preferred 84 $\frac{3}{4}$; Railway Spring common 35; Republic common 17 $\frac{1}{2}$, preferred 67 $\frac{1}{2}$; Sloss-Sheffield common 50; Cast Iron Pipe common 27 $\frac{1}{2}$, preferred 75 $\frac{1}{4}$; Can common 5, preferred 54 $\frac{1}{2}$.

The Buffalo & Susquehanna Iron Company is reducing its funded debt by the redemption of \$100,000 of its first mortgage 5 per cent. bonds, Nos. 101 to 200, inclusive, the necessary funds being taken from surplus earnings. Last year at this time the company redeemed a like amount of the same issue.

Dividends.—The General Electric Company has declared the regular quarterly dividend of 2 per cent., payable July 15.

The Cincinnati Foundry Foremen.—The Cincinnati section of the Associated Foundry Foremen held its most important meeting of the year on the evening of May 23 at the Palace Hotel. It was the annual gathering of the section, which includes foundry foremen from most of the foundries in Cincinnati and vicinity, taking in southern and central Ohio, northern Kentucky and eastern and southern Indiana. Additional interest was imparted to the occasion because it was also a meeting of preparation for the campaign to be inaugurated in behalf of Cincinnati for the next convention of the American Foundrymen's Association. The address of the evening was delivered by John Logan, superintendent of the foundry department of the National Cash Register Company, Dayton, Ohio, and it was so much appreciated that he was elected president for the ensuing year. Mr. Logan talked on "Daily Observations in the Foundry." He brought out many technical points not often discussed and developed some very instructive lines of practice. Other officers elected were as follows: Vice-president, George W. Piehl, Blymyer Iron Works Company, Cincinnati; treasurer, John C. Burns, Samuel C. Tatum Company, Cincinnati; secretary, F. W. Weissman.

A Large Coal Contract.—PITTSBURGH, PA., May 27, 1908.—(By Telegraph.)—The Washington Coal & Coke Company, Dawson, Pa., N. P. Hyndman, sales agent, Conestoga Building, Pittsburgh, has made a contract with the United Iron & Steel Company for 150,000 tons of coking coal to be shipped at the rate of 20,000 tons a month. The coal will be used by the buyer in making coke at its Cherry Valley Furnace, at Leetonia, Ohio, which started up last week after being idle several months. Reports that the Washington Coal & Coke Company would start up 1000 more coke ovens at its Star Junction Works, Star Junction, Pa., are untrue.

The International Nickel Company.

The International Nickel Company has issued its annual report for the year ended March 31, 1908. The income account, including constituent companies in America, compares as follows:

	1908.	1907.
Earnings from constituent companies....	\$2,434,952	\$2,853,280
Other income.....	.....	369
Total income.....	\$2,434,952	\$2,853,649
Expenses, taxes, &c.....	149,583	164,186
Net income.....	\$2,285,369	\$2,689,463
Interest, sinking fund, depreciation, &c....	960,627	899,964
Operating surplus.....	\$1,324,742	\$1,789,499
Preferred dividends.....	534,733	534,730
Surplus for year.....	*\$790,009	\$1,254,769

* Equal to 8.95 per cent. earned on the \$8,822,661 outstanding common stock.

The profit and loss account shows as follows: Balance April 1, 1907, \$1,755,617; surplus for year, \$790,009; total surplus, \$2,545,626; from which deduct reserve to cover accounts of foreign constituent companies, \$28,826, reserve for depreciation, \$300,000, leaving a profit and loss surplus on April 1, 1908, of \$2,216,799.

During the past year \$1,548,481 was expended for new construction, equipment and replacements. In the same period there has been provided out of earnings the sum of \$478,576 for the following funds: Regular allowance for depreciation of plants, \$215,975; exhaustion of minerals, \$94,351, and bond sinking fund, \$168,250. There has been appropriated from the surplus for further depreciation of properties, \$300,000.

As the sales are either for cash or are guaranteed by selling agents, the company has not provided any contingent or reserve fund for the collection of outstanding accounts. As yet the company has suffered no losses.

All buildings that are not of fireproof construction are fully covered by insurance. In addition, a fund is being accumulated which at the end of a short time will be sufficient to enable the company to dispense with purchase of outside insurance.

The net profits for the fiscal year, after deducting expenses, depreciation, exhaustion of minerals, bond sinking fund and all other charges, were \$1,324,742.

The Union Iron & Steel Company's New Owners.—

By the purchase at auction in Cincinnati May 25 of \$200,000 face value of the bonds of the Union Iron & Steel Company of Delaware, Rogers, Brown & Co. come into control of the corporation at a cost of \$25,000. The company went into the hands of a receiver in September of last year. It was a survival of the \$60,000,000 Union Steel Chain Company formed by Edward L. Harper, once vice president of the Fidelity National Bank of Cincinnati. The company has been only a small factor in the iron trade, although it has plants at Ironton, Ohio; Big Stone Gap, Va.; Chatham, N. Y.; Denver, Col., and Birmingham, Ala. The bonds are a lien on the Ironton property.

An Incorrect Report.—William G. Park, chairman of the Crucible Steel Company of America, Pittsburgh, and who was one of the receivers of the Clairton Steel Company, advises us that the printed statement that he, with the Union Trust Company, had sued for the sum of \$150,000 each, for acting as receivers, and that the courts had granted to each the sum of \$20,000, is untrue. Mr. Park says that the matter of compensation was left to the court, which decided that he and the Union Trust Company were each entitled to \$20,000 for services, and he further states that he will turn this amount over to the Crucible Steel Company. An injustice was done Mr. Park in the printed statement that suit had been entered, which was not the case.

The Cunard turbine steamship *Lusitania* beat all records for the westward trip from Europe on its voyage ending at New York May 22, its time being 4 days, 20 hours and 22 minutes. Its average for the run was 24.83 knots an hour, and its best day's run was 632 miles.

A Building with Metal Lumber Framing.

A cement plaster twin dwelling house has been erected at Tuxedo Park, N. Y., which accentuates the use to which metal and noncombustible materials generally can be put in ordinary building construction. Perhaps its most interesting feature lies in the use of metal instead of wood for its frame work. The method of construction is similar to what is known as wood balloon framing, but the structural parts consist of specially designed sheet steel shapes made to serve as the uprights and the roof rafters, these shapes being given the name of metal lumber. The floors and roofing are made of what is known as ferrolithic plate which is metal in a somewhat corrugated form, this metal being covered with concrete plaster as the wearing finish. The exterior and interior surfaces of the building are concrete and plaster respectively, and these are applied to expanded metal lath which is fastened in the usual way to the so-called metal lumber. The structure proper thus has no combustible material in its make up with the exception of the wood trim.

After the foundation walls of concrete were completed, a steel channel track was attached to the foundation by means of expansion bolts. The erection of the studs for the exterior walls was commenced at the corners, special corner studs being first placed in position. The bottom of these studs was placed in the channel track on the foundation, the flanges of the studs were riveted to the flanges of the track and the spaces between the studs were filled in with concrete to a depth of 1½ in., thus anchoring the studs to the foundation. Six inch studs were used for the exterior walls and extended from the foundation to the roof line. Four inch studs were employed for the interior partitions. The first floor was constructed of ferrolithic plate as mentioned, plastered underneath and concreted to a depth of 2½ in. on top. These floor plates rest on concrete girders having a special reinforcement. The girders were in turn supported by concrete piers. In the second floor construction specially designed I-joists 5 in. deep were employed, these joists resting on an angle wall ribbon which was riveted to the exterior studs at the second floor line. The top joists were formed of 6 in. channels and extended 2 ft. over the outer line of the building. The metal rafters were 6 in. in depth and the ferrolithic plates of the roof construction were plastered underneath and concreted above with cement mortar and covered by asbestos waterproofing material attached by heavy pitch. The rafters, joists and studs were braced with strap steel bridging.

Various steel members of the construction were cut to the desired lengths at the factory and erected on the field by means of erection derricks, similar to those in structural steel building. The finished floors were of wood secured to the joists or reinforced concrete floors by means of nailing blocks. The stair forms were constructed of ferrolithic plate concreted to form treads and risers, and provided with nailing blocks for attaching wood finish. The chimney contains four flues of terra cotta, and the hot air ducts for the heating system were carried up in the partitions, as they would be in a wood constructed building.

The steel construction was designed by H. M. Maugle, Canton, Ohio; the contract was executed by Taft-Howell Company, Cornwall Landing, N. Y., and the structural materials were furnished by the Berger Mfg. Company, Canton, Ohio.

The United States battleship *Michigan* was successfully launched by the New York Shipbuilding Company, Camden, N. J., May 26. The *Michigan* is the first of the "all big gun" battleships being built for the Government. It has a displacement of 16,000 tons, and the main battery will consist of 8 12-in. rifles.

The Niles Car Mfg. Company, Niles, Ohio, has received an order for two electric street cars for the Milwaukee Northern Railroad, to be duplicates of cars built last year, and an order for two express cars for the Pittsburgh Interurban Line. The plant is now operating to about full capacity.

The Machinery Trade.

NEW YORK, May 27, 1908.

More inquiries were reported in the trade the past week, and though practically all of them covered small lots of tools they indicate an upward tendency. This increased activity on the part of the smaller buyers, together with better reports from traveling salesmen, has created a more optimistic feeling among machinery houses. Actual business, however, has not increased to any extent. The little being done by the railroads and larger corporations is not encouraging. But few new projects of magnitude have developed since our last report and they are being followed closely by the trade. Among them are the new shops for the Idaho & Washington Northern Railroad, for which Westinghouse, Church, Kerr & Co. will do the buying, and the improvements to be made by the Third Avenue Railroad. Some houses which pay particular attention to export trade report a better demand. The Chicago Pneumatic Tool Company has received some good orders for air compressors from Europe.

Idaho and Washington Northern Railroad's New Shops.

Plans have been completed for the new shops to be constructed at Spirit Lake, Idaho, for the Idaho & Washington Northern Railroad and purchases of the machine tool equipment for these shops will soon be made. The entire plant will cost about \$100,000 and will be modern in every respect. The contract for the construction and equipment of the shops has been placed with Westinghouse, Church, Kerr & Co., New York, who will undoubtedly soon place orders for a considerable amount of machine tool equipment, including wheel presses, lathes and all necessary machinery to constitute a complete machine and erecting shop equipment. We understand that the equipment has not yet been purchased. The engineering firm is getting ready to start work of constructing the plant, which will consist of a machine and erecting shop, 70 x 210 ft.; blacksmith shop and boiler room, 40 x 97 ft.; storeroom and office, 30 x 120 ft.; nine-stall roundhouse, 10-pocket coal chute with inclined trestle, 75-ft. turntable and smaller buildings. The construction of these shops has been in contemplation for some months and the trade has been following the matter closely, especially since the contract has been awarded to the New York house, as it will mean the purchase of a considerable amount of machine tool equipment in this territory.

Preliminary plans have been prepared by the Canadian Northern Ontario Railroad, Toronto, Ont., for the erection of new shops on Eastern avenue, but it has not yet been decided to go ahead with the work. W. P. Chapman is resident engineer.

The large amount of money to be spent in improving the Third Avenue Railway in New York will necessitate the purchase of considerable mechanical equipment. The receiver has been authorized to issue certificates to an amount not to exceed \$2,500,000 for the improvements, of which \$300,000 is to be spent for repairs to cars and for purchasing new motors, controllers and other electrical equipment; \$436,000 for renewals and repairs and maintenance of tracks and electrical equipment; \$225,000 for the erection of a new power station at 161st street, and \$225,000 for the erecting of a new power station upon a suitable site, to be determined by the receiver, in the neighborhood of the Kingsbridge plant of the Union Railway Company.

What is probably one of the largest developments in the way of machinery requirements to come before the trade in this vicinity for some time will develop within the next few weeks, when James Stewart & Co., 135 Broadway, New York, will take bids on equipment for a large plant to be erected by the Cramp Dry Dock Company at Norfolk, Va. This enterprise will constitute a general ship repairing plant, and its construction and equipment will cost about \$500,000. Preliminary bids are now being taken on dredging, filling, bulkheading and piling work and the construction of two marine railways. A good sized machine shop is included in the requirements, and plans for this and the rest of the equipment are being prepared under the supervision of J. A. C. Groner, who is the engineer in charge. The full details as to the company's requirements have not as yet reached the office of James Stewart & Co., where it is understood all bids are to be received.

Among the important inquiries received in the trade the past week was that sent out by the Department of Water Supply, Gas and Electricity, New York, covering 10 tools. This equipment, bids for which are to be opened June 10, is required for one of the Brooklyn stations. The machines on which figures are being prepared include one 42-in. vertical boring and turning mill, one 18 in. by 10 ft. quick change gear engine lathe, one 24 in. by 14 ft. quick change gear engine lathe, one 11 in. by 5 ft. speed lathe, one 14-in. upright sensitive drilling machine, one 3½-in. wet drill grinder, one 20-in. water tool grinder, one 100,000-lb. ver-

tical screw power testing machine, motor driven; one improved recording machine and one 18 in. by 6 ft. improved turret lathe.

Plans are being made by the firm of Robert H. Ingersoll & Bro., New York, watch manufacturers, for making some machinery additions and power alterations in the plant of the Trenton Watch Company, which was acquired by the firm two weeks ago. This plant, which was in fair working order, is to be overhauled and later on perhaps some substantial additions will be made. At present the company has in contemplation the installation of about 150 hp. in boilers and engines and the equipment of the plant throughout with proper electric lighting facilities and motor drives. This will necessitate a good sized motor order, and later on perhaps some machine tools and similar equipment will be added. Eventually the company will make substantial additions to the plant. The company's Trenton establishment will be used for making watches costing from \$10 to \$12 each, and at present it is equipped to turn out about 600 watches of this class a day. Charles H. Ingersoll, Jr., who is a member of the firm, is in charge, and he is at present dividing his time between the company's Trenton plant and the New York office at 45 John street.

Preliminary surveys are being made under the direction of J. G. White & Co., 43 Exchange place, New York, for developing the water power of the Horsepasture Creek in west North Carolina. These surveys are being made for the purpose of looking into the feasibility of developing the power of this stream for distribution in the vicinity for factory and lighting purposes. It is estimated that about 50,000 hp. can be developed, and if it can be shown that there is sufficient demand for it the project will proceed at once.

The Hudson Valley Construction Company, Troy, N. Y., has a contract for building a good sized power house for the Schaghticoke Electric Company at that place. Viehle, Blackwell & Buck, 49 Wall street, have been engaged as consulting engineers, and it is understood that the details will be worked out and probably the purchasing done at the Hudson Valley Construction Company's office at Troy.

Contracts have been awarded for building five of the six sections of the Fourth Avenue Subway in Brooklyn, bids for which were received a few weeks ago. The successful bidders are William Bradley, New York, section 2, extending from Willoughby street to Ashland place, \$3,494,714, and contract No. 3, extending from Ashland place to Sackett street, \$3,600,226.50; E. E. Smith Contracting Company, New York, contract No. 4, extending from Sackett street to Tenth street, \$2,490,205.30, and contract No. 6, extending from Twenty-seventh street to Forty-third street, \$2,982,647.80; Tidewater Building Company and Thomas B. Bryson, New York, contract No. 5, extending from Tenth street to Twenty-seventh street, \$2,196,716.50.

Business Changes.

The New York offices of the Warner & Swasey Company, formerly located in the Singer Building Annex, have been removed to the new Singer Building Tower, on the twenty-fourth floor.

Chicago Machinery Market.

CHICAGO, ILL., May 26, 1908.

A review of the trade in machinery lines for the past week fails to disclose anything that can be confidently regarded as indicative of positive permanent improvement. As has been the case for some time past the orders are principally for individual tools or supplementary equipment of various kinds. Here and there, however, some of the larger manufacturers have been favored with new business, which has included some fair sized units in steam and electric generative and motive power machinery. While such orders are helpful in the present situation the fact remains that they are not coming out in sufficient number to warrant the increase of working forces of even the most favored shops. In reply to an inquiry concerning the most fruitful source of machinery orders a prominent manufacturer stated that a tabulation of recent purchases showed a good percentage in favor of coal mines, stone crushing and cement machinery and saw mills, the demand from the latter being principally from the Northwest. Since it is well known that on account of the dull season and the added effects of the industrial depression work in the coal fields is greatly curtailed, it is assumed that operators are taking advantage of the lull to overhaul and renew their machinery equipment. Considering the high pressure under which such plants have been worked during recent prosperous years there is undoubtedly ample room for such renewals in many mines. The development of timber properties in the Northwest, extending up into the British possessions is a natural result of expansion in that direction. The utilization of these timber properties calls for the establishment of extensive lumber mills, for the equipment of which considerable machinery has been and will be purchased.

No recent inquiries for round lots of machine tools have

appeared in the market, and the business is in the main dependent upon scattering requirements of the general trade. In spite of the existing quietness there is no evidence of the deep feeling of discouragement among dealers. None, it is true, is looking for a quick and powerful reaction, but many are convinced that a turn of the tide is not far away. The railroads continue to be conspicuous by their absence in the market for tool requirements of any note. One or two Western lines are reported as contemplating some purchases after the end of their fiscal year, which terminates July 1. Their policy, it is understood, is to restrict expenditures for the current year to the closest possible limits in order to make as favorable a financial showing as possible. It is conjectured by those close in touch with railroad policies that a freer hand will be given purchasing agents after July 1, and the hope of increased business from the roads is in many quarters based on this expectation.

The Milwaukee Machine Tool Company, Milwaukee, Wis., which began business in December of last year, has perfected and is now putting on the market a new 16-in. plain engine lathe, known as the Milwaukee lathe. This tool is of extra heavy design and is provided with a new design of quick feed change attachments, which, together with other features of improvement, are aimed to make it an up to date and effective tool.

The plant of the Stephens-Adamson Mfg. Company, Aurora, Ill., making elevating, conveying and transmitting machinery, whose capacity was practically doubled last year, is now running 10 hr. per day but with reduced force. The company reports that shipments in May show considerable improvement over the first three months of the year and an increasing number of inquiries have been coming in in the past few weeks.

Within the past few days the Kempsmith Mfg. Company, Milwaukee, Wis., has booked orders for several good sized milling machines. While now running at about 50 per cent. capacity, the company reports that new business entered during the first two weeks of May is in excess of that of any like period in the last two months.

The Fred M. Prescott Steam Pump Company, Milwaukee, Wis., is erecting a new one-story pattern storage house, about 100 x 100 ft., designed to take care of surplus pattern accumulations. Among the recent orders booked by the company was one for a municipal pumping plant of fair capacity, installed in a northern Wisconsin city.

A contract has been awarded by the United States Reclamation Service to the Northern Electrical Mfg. Company, Madison, Wis., for furnishing electrical controlling apparatus for the operating of sluice gates in Laguna dam, Yuma irrigation project, California-Arizona. The amount of the contract was \$4628.60.

Shipment has been made within the past week from the West Allis Works of the Allis-Chalmers Company, Milwaukee, Wis., of eight turbo-generator units of 9500-kw. normal capacity rating. Included in this shipment were two 1500-kw. units for the Youngstown Sheet & Tube Company, Youngstown, Ohio; one 1500-kw. unit for a Jacksonville, Fla., electric plant; one 500 and one 1000 kw. units, Celluloid Company, Newark, N. J.; one 1500-kw. unit, Tremont & Suffolk Mills, Lowell, Mass., and one 1000-kw. each for the Athens Electric Railway, Athens, Ga., and the Nairn Linoleum Company, Kearney, N. J. It is significant that all of these machines were built on orders placed since the beginning of the recent depression.

A 5-ton, three motor electric steel derrick, of 75-ft. radius and 60-ft. lift, has just been installed in the plant of the St. Louis Basket & Box Company, St. Louis, Mo., by the Northern Engineering Works, Detroit, Mich. This machine is of the high speed type, hoisting 60 ft. to 125 ft. per minute, with all its motions operated by electric motor. The derrick is located on the river bank to handle material from the river to the factory yard, and is supported by legs and frame of latticed steel construction.

The Oklahoma-El Reno Interurban Traction Company, Oklahoma City, Okla., and Kansas City, Mo., has recently been incorporated under the laws of Oklahoma with a capital stock of \$2,000,000, for the purpose of constructing an electric interurban line between Oklahoma City and El Reno, a distance of 24½ miles. The company is soliciting information from firms selling rails, cars and electric railway equipment, timber, ties, poles, &c.

The City Council of Edmond, Okla., will receive bids until June 15 for machinery for a complete system of water works, to include two 125-hp. tubular boilers, two duplex steam pumps, one straight line air compressor, one feed water heater, two boiler feed pumps, 250 tons of cast iron pipe and other material.

The American Blower Company, Detroit, Mich., has not yet decided just what equipment it will have to buy for the large foundry which it recently purchased from the North-Western Foundry & Supply Company, and which it is thoroughly overhauling and remodeling, with the intention of making it a modern plant in every respect. The plant, which has a capacity of 50 tons per day, will be equipped with molding machines and the latest foundry appliances of every kind for the manufacture of castings used in the products of the American Blower Company.

Cleveland Machinery Market.

CLEVELAND, OHIO, May 26, 1908.

The past week has been a very quiet one in the local machinery and machine tool market, the volume of orders being less than during the preceding week. Sales were mostly confined to single tools in small sizes. While there are no large new inquiries in the market there is a fair volume of small inquiries coming in, but all inquiries are still very slow in materializing into orders. While there is nothing in the present condition of the market to cause the change, a better feeling seems to prevail among dealers than there has for some time. Current orders are mostly from small concerns, buying being pretty evenly divided among the various kinds of machine tools. The demand for sheet metal working machinery has kept up in fairly good shape during the entire spring, plants engaged in many lines of sheet metal work not being seriously affected by the depression.

The action of the dealers and builders of machine tools in reaffirming prices seems to meet general approval among the local manufacturers and dealers, but the settlement of the price question is not expected to stimulate activity, dealers going on the supposition that any one really wanting new tools could not afford to wait for several weeks to make purchases on the possibility that he might save a few dollars in the price.

From the offerings in the various parts of the State local dealers are picking up good sized stocks of second-hand tools at prices low enough to insure a good margin of profit. The demand for second-hand tools is only fair.

Conditions remain about stationary with builders of machine tools and manufacturers in general. Builders report no improvement in orders for machine tools, but more attention is being paid to special machinery, and some plants are fairly busy that would have little to do were they depending entirely on their machine tool business. Inquiries for heavy machinery are somewhat better and makers are encouraged with the outlook. There is a fair demand for small electric power equipment. The automobile industry shows some further improvement, and at least two local plants are running full with day and night shifts to complete their 1908 machines already under contract. There is some increase in the number of new industrial enterprises formed to engage in various metal working lines, but these new concerns as a rule are slow in carrying out their plans for the starting of new plants.

A slight improvement is noted in the jobbing foundry trade, although orders are still small and for immediate needs.

The Walworth Run Foundry Company has just completed a large addition to its plant on West Twenty-seventh street, Cleveland. A new building has been erected adjoining the company's old foundry, 50 x 170 ft., of brick, four stories high. It will be used for the casing ring, register and steel stamping departments and for cleaning, tumbling and molding rooms. The addition gives the company an increase of about 50 per cent. to its molding shop capacity. All the most modern equipment has been provided for the making and handling of the company's products. A railroad siding and elevator permits the easy loading of cars from every floor direct from the elevator. One floor is used entirely for the storage of patterns. The steel stamping department is an entirely new one with this company. Seven power punch presses have been installed and the company, in addition to doing its own stamping, is now in shape to turn out light steel stampings for the trade.

The Peter Gerlach Company, Cleveland, maker of barrel making machinery, reports that its business has not been affected by the recent depression and that its volume of business during the past few months has been as large as during the corresponding period a year ago. A very satisfactory volume of orders for this class of machinery is coming in from the South.

The Seaton Spring Wheel Company is being formed in Cleveland for the manufacture of a spring automobile wheel. The capitalization will be about \$150,000. It is the intention for the present to have only an assembling plant. Men interested in the company have an assembling plant in Detroit, which will be moved to this city as soon as a site is secured. The parent company is located in St. Louis.

The National Nut & Bolt Lock Company, Cleveland, has been incorporated, with a capital stock of \$40,000, by F. W. Schwentner, James A. Newkirk, Fred I. Hoff, W. B. Dennon and G. A. Phillips.

The Cleveland Steel Tool Company, formerly a partnership, has been incorporated under the same name, with a capital stock of \$30,000. The death of P. S. Kennard, one of the partners, a few months ago, has been followed by the addition of some other interests. The incorporators are J. F. Doolittle, A. P. Fathergill, R. J. Venning, Edith L. Venning and Jennie C. Kennard.

The United Metals Casting Company, Cleveland, has been incorporated, with a capital stock of \$10,000, to make plumbers' goods, automobile trimmings, &c., from a new composition of metal. The company is planning to start a foundry. The incorporators are W. O. Rhodes, C. F. Ackerman, Edith M. Fasig, Charles H. Taylor and C. F. Taplin.

The American Roll & Foundry Company, Canton, has increased its capital stock from \$200,000 to \$300,000.

The Twentieth Century Electric & Repair Company, Akron, recently organized to repair electrical machinery and to sell new machinery and supplies, has elected the following officers: C. L. Bigler, president and general manager; George J. Schaffer, vice-president; F. N. Hansen, treasurer, and J. M. Hassler, secretary. The company has fitted up a two-story factory at 822 Coburn street, South Akron.

The American Railway Signal Company reports a very satisfactory increase during the past few weeks in inquiries for block system equipment for railroads. The company has recently installed its system of block signals on the Pennsylvania Railroad between Cleveland and Alliance.

Some of the excess machinery of the Toledo plant of the Pope Motor Car Company has been purchased by Cleveland machinery dealers. It is reported that an offer of \$400,000 has been made for the plant, but that the receivers consider the offer about \$200,000 too low.

Cincinnati Machinery Market.

CINCINNATI, OHIO, May 26, 1908.

An easier undertone to the iron market generally lends a feeling of encouragement to the tool manufacturers who have returned from the conventions to their shops and begun preparations for their mid-year inventory of conditions, of which attention to the castings contract is one of the most important. There is considerable interest among all classes who deal in iron, either in its crude or finished state, as to what the future will develop in the matter of the new uniform contract, which is now up to the furnaces for signing, when the buying movement commences. So far as can be learned through the various agencies and brokers of iron none of the Iron Buyers' Association has been successful in buying iron on the new form, which has been out several weeks. About all the iron that has been coming into this market for six months has been on old contracts, of course excepting the pipe makers and a few stove makers. The local foundries which devote the major part of their time and forces to the manufacture of castings for the machine tool makers have just begun to feel the market for their latter half-year needs. A few of the tool manufacturers have practically concluded to begin work on tools for stock. A number of new tools, which their designers and developers had intended to put on the market late in last year or early this one and have been awaiting a more favorable time for announcing them, will be made ready for publication directly after the turn of the half year.

In the local machinery sales departments very little actual improvement is noted, but inquiries are more favorable and the future looks much more promising than it did at the same time last month. While a few manufacturers have increased their forces a trifle, others have reduced them, so that the conditions in this regard may be said to be unchanged. In the line of power transmission specialties the improvement has been slow but steady, and this line bids fair to be among the first to resume normal conditions.

The second-hand dealers are carrying good sized stocks and business with them has been fair to good, with little or no cutting reported, except in cases of other than standard tools.

The Engineers' Club celebrated guests' night at its rooms on Thursday night, May 22, with James Albert Green of Matthew Addy & Co. as speaker. Business was dispensed with and the entire evening given up to a hearing of Mr. Green's delightful talk and reminiscences of a trip with the combined commercial clubs of Cincinnati, Boston and St. Louis to the Canal Zone about a year ago. The lecture was illustrated with a series of interesting slides.

The property of the Crown Drilling Company at Akron, Ohio, is being disposed of at private sale by George W. Billow, the receiver, who has 90 days in which to wind up the affairs of the company.

The Hooven, Owens, Rentschler Company, Hamilton, Ohio, reports its plant operating on about 40 per cent. of normal capacity and force with some indirect export trade.

The F. W. Spacke Machine Company, Indianapolis, manufacturer of air compressors, motors and gasoline engines, reports business good for the past 30 days and that it has added 20 per cent. to its manufacturing equipment since January 1. The company is at work on some new machines

and is running a day shift full time, with a small night force in addition.

The Piqua Blower Company, Piqua, Ohio, reports that its plant has been almost continuously occupied the past six months, during which time it has secured some nice contracts for rolls, presses and roofing machines, in addition to its regular blower business. The company recently secured an order from the Hornbrook-Price Company, Indianapolis, Ind., for one of its large presses and dies for early delivery.

The Hetherington & Berner Company, Indianapolis, Ind., manufacturer of asphalt and tile machinery, also steel work, is gradually improving all departments of its business, which began with the erection of a new structural steel shop and power house last year.

The Buckeye Steel Castings Company, Columbus, Ohio, which has been operating one of its furnaces for some time on double turn, is contemplating starting another early in June or within a few weeks, to take care of a satisfactory increase of orders. A new steel pattern shop is one of the early improvements.

The wholesale scrap iron and metal concern of Simon Bohn, Louisville, Ky., will hereafter be known as Simon Bohn's Son. B. S. Bohn, the son, has taken over the management of the business, which is located at 220 Fifth street.

Bids are being taken by the Reliance Engineering Company, Cincinnati, Ohio, for machinery, engines, boilers and other equipment for the \$50,000 plant of the Spencer Light, Power, Heat & Water Company, Spencer, Ind. Bids will be closed this week on 300 tons of 4, 6 and 8 in. cast iron pipe, and soon for centrifugal pump, direct acting pump, boiler feed pump, air compressor, 200-hp. engine, arc and incandescent lamps, transformers, poles, wires, &c. The Allis-Chalmers Company secured the contract for the 150-hp. generator.

Philadelphia Machinery Market.

PHILADELPHIA, PA., May 26, 1908.

Developments looking toward any genuine improvement in the demand for machinery and tools in this territory are not pronounced. Inquiries are not numerous, and such as are received by the trade are usually for equipment of a minor character. The week, therefore, has not brought any increased activity, and business is practically stationary. The railroads and the larger industrial plants show no disposition to enter the market. Railroad shops are running short handed, and industrial establishments show but little improvement, and until these interests, which constitute a good share of the tool buyers, come into the market, trade will naturally continue dull. New plants are not being projected at this time, except those of a small size, which, when they do come into the market, take small quantities and usually small tools. Some encouragement is taken by the trade from the increased activity in the iron market, but this must not be taken too seriously at the moment, as it will require some time and continued active buying to get back to anything like normal conditions in that branch of the trade. Foundries and steel mills are hardly as active as would appear on the surface, many still being operated on less than a 50 per cent. basis, and it will require more active conditions than are now apparent for the machinery trade to be benefited to any extent from those sources.

In some directions it is believed that buying would result without much delay, could future conditions be discounted, but those disposed to make purchases hold their orders back pending further developments. Sales during the week, therefore, have been light and confined closely to the smaller tools. Orders for a few heavy tools, a few milling machines, a boring mill and some special tools are noted, but the general line of standard tools was pretty generally neglected.

The convention of the National Machine Tool Builders, at Atlantic City, N. J., last week, commanded a considerable share of attention on the part of both local builders and merchants. Uniform cost accounting was given particular attention by the members. It may be said that prices have been well maintained, particularly when the extreme desire for business on the part of many manufacturers is considered. The expression is general that prices of tools will be maintained.

Manufacturers in this territory report no particular increase in orders, the business received being more or less scattered, and the plants continue to be operated with reduced force. Some tool builders have but a small amount of work ahead, and are dependent on week to week business to maintain their present production; others are more favorably situated and have enough to keep them going 30 to 60 days. Builders who are able to keep full forces employed are few.

Second-hand machinery and tools continue in good demand. Buyers canvass this field pretty thoroughly and fre-

quent sales are reported by the dealers. The business is confined, however, to tools of the medium and smaller classes and sales are usually single tools.

The engine and boiler trade reports no change in general conditions. There is some demand for boiler equipment in the larger capacities, but not much business has developed for the medium and small power equipment.

No material improvement is to be noted in the foundry trade. Machinery castings are in light demand, while other branches of the trade show no betterment to speak of. Orders for both steel and gray iron castings are few, and usually placed for prompt shipment. No contracts for forward delivery have been made, consumers not being inclined to anticipate their requirements.

Proposals will be received by the Commissioner of Health of the State of Pennsylvania until 5 p.m. June 9, for the construction of a water works system for the Pennsylvania State South Mountain Sanatorium, near Mont Alto, Franklin County. The work includes a reinforced concrete reservoir of 300,000-gal. capacity; two concrete collecting wells of 40,000 and 7500 gal. capacity, respectively; a pump house, with two triplex pumps, driven by gasoline engines; 5000 ft. of 6-in. cast iron pipe lines; 4000 ft. of 4-in. pipe lines; 10,000 ft. of 3-in. and 2-in. pipe lines, together with all appurtenances and connections to the existing water system. Copies of specifications and plans may be obtained from Samuel G. Dixon, Commissioner of Health, Harrisburg, Pa., upon depositing \$25, which will be returned upon the return of the plans and specifications.

T. P. Conard & Co. report an increased demand for boilers, particularly those of the larger capacities. Railroad and contractors' buying has been light, although there is some little inquiry from the latter source and a sale of a large concrete mixer is to be noted. Several Maxim water tube boilers have been recently sold, one of which was for an installation of 3500 hp. The outlook as far as the boiler trade is concerned is considered encouraging.

Norristown, Montgomery County, Pa., will, it is understood, soon erect a garbage disposal plant, the sum of \$25,000 having been set aside for that purpose. A new filter plant is also proposed, for which the site has already been acquired.

The Commissioners of Fairmount Park, Philadelphia, will receive proposals until May 29 for furnishing a steam road roller for use in the park. A quantity of fencing, railing and columns for use in the Zoological Gardens are also required. Specifications may be obtained from J. T. Vogdes, chief engineer, rooms 127-129, City Hall.

The Zephyr Ventilator Mfg. Company, which took over the business of the National Tool & Stamping Company some time ago, is making plans to engage more particularly in that particular branch of work. Some new equipment has been added so that the company is now prepared to handle promptly sheet metal stamping and drawing of every description.

The Baldwin Locomotive Works still continues to operate six days a week, 5 hr. per day, employing about 5000 men. Some little new business has been taken, among which was an order for six mogul locomotives for the Iowa Central Railroad. Railroads generally, however, still withhold orders for engines, although considerable work in the way of repairs is coming out. Most of the business taken is for single engines, largely for industrial plants and some of the minor railroads.

New England Machinery Market.

WORCESTER, MASS., May 26, 1908.

The machine tool dealers will undoubtedly reach larger totals in their sales for May than any month since the year opened. Some fair orders have been booked the past week, and sales of individual machines and second-hand tools have been more numerous. This is not considered to mean, however, that a change has taken place which will intensify during the summer, but rather the usual relative importance of the month of May. General business in this section seems to have stiffened up to some extent. Nearly everyone reports that the outlook seems brighter, though there is nothing actually tangible in the reasons offered to support the view. Certainly a much greater confidence prevails.

Orders are being booked by the dealers from concerns with which they have had but slight business relations in the past, because the salesmen in their greater activity have spent a good deal of time on possible customers who had previously been neglected. One very comfortable order was received a few days ago from a company which had been given little or no attention from the house until times became dull. Persistent effort brought an order which has not been duplicated many times in recent months. This new missionary work will be of important advantage to those who have carried it out consistently.

The New England machinery builders express the greatest satisfaction at the sentiment regarding the maintenance of prices which prevailed unanimously among the members

of the National Machine Tool Builders' Association during the meeting at Atlantic City last week. This meeting and that of the supply associations have done a great deal of good in bringing together the manufacturers for the purpose of interchanging ideas on various matters, especially as to prices. The announcement in *The Iron Age* of last week that certain machinery builders had even advanced their prices was received with evident pleasure. There is in evidence a feeling of increased confidence begot from the expression by manufacturers from all parts of the country, and this is accentuated by a slightly increased demand for machinery and a new influx of inquiries. The unanimity of sentiment among the steel manufacturers as to maintaining their prices, which was brought out at the meeting in New York last week, is regarded as another important indication of the general feeling in industrial circles. Altogether a general strengthening of sentiment in New England has resulted from the co-operative efforts of the several important organizations which have recently been in conference.

Machinery Requirements of Lowell Textile School.

The Lowell Textile School, Lowell, Mass., will require a 50 kw. steam turbine in addition to other new equipment, an appropriation for which was recently obtained from the Massachusetts Legislature. The management states that no preference exists as to type of turbine, nor is the amount of power restricted to the exact size specified. The machine tool list is as follows: One 14 in. by 6 ft. standard engine lathe, fitted with 12-in. four-jaw independent chuck; one 14 in. by 6 ft. quick change engine lathe, fitted with 12-in. four-jaw combination chuck; one 18 in. by 10 ft. standard engine lathe, with taper attachment, fitted with 18-in. four-jaw independent chuck; one 11 in. by 5 ft. speed lathe, with compound rest, fitted with 17-32 in. drill chuck; one 11 in. by 5 ft. speed lathe, without compound rest, fitted with 17-32 in. drill chuck; one 20-in. upright drill, back geared and power feed, fitted with 1 in. drill chuck; one 14 in. sensitive drill, fitted with 17-32 in. drill chuck; one 24 x 24 in. by 6 ft. planer, with 18 in. planer chuck; one universal milling machine with three feeds, automatic; one 20-in. wet tool grinder and wheel; one twist drill grinder; one two-wheel 12-in. grinder and wheels; one 36 x 6 in. grindstone frame with stone; one centering machine, capacity 4 in., with four-jawed chuck; one power hack saw; six 4-in. swivel jaw and base vices; one 16 in. by 8 ft. pattern makers' lathe; one single saw bench; one 36-in. band saw; two pattern makers' vices; two portable forges, 36 x 28 in.; two steel anvils, 150 lb.; two blacksmiths' post vices. It will be noted that the equipment is all full size, following the plan of the engineering schools rather than that of the manual training and many of the trade schools. The establishment of this department of a school whose function is to train young men for the textile industry emphasizes the important part played by the machine shop in the textile mills. Graduates of the school have time after time brought to the attention of the management the need of this department of training, as taught by their own experience, and the management of the school has for some time been trying to get the necessary funds for the purpose, the effort now being crowned with success. The statement is frequently made that the management of a textile manufacturing establishment must give more attention to general engineering problems than those which deal more directly with their products, and consequently the textile schools are laying great stress on this branch of the training of their students.

An unverified dispatch from Pine Meadow, Conn., states that the Chapin-Stevens Company of that place, manufacturer of carpenters' tools, has entered into a combination with the Ohio Tool Company and the Sandusky Tool Company, and that the combination has bought the business of the Martin Dösher Plane & Tool Company, Saugatuck, Conn. The dispatch goes on to state that other concerns will be absorbed.

Another preliminary to the moving of the business of the W. D. Forbes Mfg. Company from Hoboken, N. J., to New London, Conn., is the incorporation of the business under Connecticut laws, with a capital stock of \$160,000. The name will be unchanged. The charter authorizes the company to build boilers and engines. The work of erecting a new and larger plant will be hastened.

The Osgood Bradley & Sons Company, Worcester, Mass., car builder, is making tentative plans for the establishment of new works in that city, which will be on a much larger scale than the present establishment. The land occupied by the company's business is included in the property which will be taken by the New York Central Railroad in the abolishing of the city's grade crossings and the building of a new passenger station. It will consequently be necessary that other works be provided, as the company has contracts in hand which almost reach the extreme capacity of present manufacturing facilities for two years to come. Consequently provision will have to be made to replace the existing plant. The company states that the new works will be much larger, employing up to 1000 hands. The business is independent of the combination of car builders effected several years ago. One of the incentives for the maintenance of this position was

a contract awarded it by the New York, New Haven & Hartford Railroad for 100 cars a year for five years, totalling between \$4,000,000 and \$5,000,000. This contract has two years to run. The new plant will be larger than the 100-car capacity, however, to provide for other business. As to when the work of establishing the works will begin cannot be determined. It may be this year and possibly not until next. Everything depends upon the rapidity with which the work, already begun, of abolishing grade crossings is carried along. The company has not determined upon a site for its works, but it has a place in mind, it is stated. The present equipment will be inadequate for the shops of the future, and doubtless the company will be a large purchaser when the time arrives that it must enter the machinery market.

One of the most important railroad announcements made in recent years in New England is that of the New York, New Haven & Hartford of its arrangement with the Canadian Pacific by which Western freight rates will be materially reduced for shippers, especially those of southern New England, where are located very important manufacturing interests. The new line will be on the differential basis, which makes possible a reduction of from 1 to 5 cents per 100 lb at the sacrifice of a certain amount of time in transit. Boston, Worcester and other cities on the Boston & Maine system have had the advantage of these rates for some time, but Providence and other centers of Rhode Island, southern Massachusetts and practically all of Connecticut have not been favored and will reap the advantage of the innovation. Freights will be diverted from the Pennsylvania, Lehigh and Lackawanna systems. While some of the places affected have enjoyed the differential of a rail and water route, to most of them the saving will be something hitherto impossible.

The Union Twist Drill Company, Athol, Mass., has completed its line of twist drills, with the exception of a few of the larger sizes, which are not in great demand just now. The company reports an unusual demand for new forms of cutters and an increasing number of orders for hobs for cutting spur gears. The works are running 45 hr. a week.

The Union Hardware Company, Torrington, Conn., is running full time in its roller skate and fishing tackle departments.

Government Purchases.

WASHINGTON, D. C., May 26, 1908.

An act making appropriations for the naval service for the fiscal year ending June 30, provides for the following equipment: New York Navy Yard and magazine at Dover, N. J., for machine tools, \$10,000; Mare Island Navy Yard, machine tools, \$50,000; Washington naval gun factory, for new and improved machinery, \$150,000; machinery, Portsmouth, \$30,000; Boston, \$25,000; New York, \$40,000; Philadelphia, \$25,000; Norfolk, \$25,000; Pensacola, \$10,000; New Orleans, \$10,000; Mare Island, \$25,000; Puget Sound, \$25,000; Cavite, \$15,000; Olongapo, \$25,000. Machinery and tools in the following equipment buildings which have been appropriated for and are nearly completed: At Charleston, S. C., \$50,000; New Orleans, \$25,000; Pensacola, \$25,000; for the establishment of coal depots, \$450,000; Portsmouth, electric plant extension, \$20,000, and main central power plant, \$9000; Boston, power plant extension, \$150,000; New York, electric plant extension, \$40,000, and central power plant, \$115,000; Philadelphia, chemical power plant extension, \$150,000; Washington, machinery for power plant extension, \$12,000; Norfolk, electric plant extension, \$50,000, central power plant, \$200,000; compressed air system extension, \$10,000; crane for building No. 23; Charleston, power plant, \$7000, and central power plant, \$15,000; New Orleans, central heating system, \$10,000, and machine shop, \$6000; Mare Island, central power plant, \$100,000; Puget Sound, electric light plant extension, \$5000; heating system, \$6000; central power plant extension, \$280,000, and foundry, \$50,000; Pearl Harbor, Hawaii, construction of dry dock, \$300,000; erection of machine shop, \$100,000; one 100-ton floating derrick, \$100,000; Naval Academy, Annapolis, additional pumps, &c., \$40,000; naval magazine, Mare Island, compressed air locomotive, \$3500; hoisting crane, \$2000; additional machinery for torpedo factory, Newport, \$50,000.

The appropriation for the army includes \$7000 for the purchase of engines, generators, motors, &c., for the artillery service.

The Bureau of Yards and Docks, Navy Department, Washington, will receive bids until June 13 for one 5000 cu. ft. air compressor and accessories for the League Island Navy Yard.

The Department of Agriculture, Washington, D. C., will receive bids until June 2 for a portable refrigerating plant.

The Isthmian Canal Commission will receive bids until June 15, Circular No. 443, for shop machines and other supplies.

The Isthmian Canal Commission will soon ask bids for one 5-ton, one 3-ton, two 1½-ton and two 1-ton pneumatic geared air hoists and other supplies.

The following bids were opened May 18, Circular No. 438, for machinery for the Isthmian Canal Commission:

Class 1.—Three locomotive coaling cranes—Bidder 7, American Hoist & Derrick Company, St. Paul, Minn., \$18,642; 32, Brown Hoisting Machinery Company, New York, \$24,600; 33, Browning Engineering Company, Cleveland, Ohio, \$22,330.50 and \$24,964.20; 74, Fox Brothers & Co., New York, \$29,025; 98, Industrial Works, Bay City, Mich., \$25,500; 101, Interstate Engineering Company, Bedford, Ohio, \$22,890; 126, McMyler Manufacturing Company, Cleveland, Ohio, \$30,900 and \$31,800.

Class 2.—One steam hammer—Bidder 34, Buffalo Foundry & Machine Company, Buffalo, N. Y., \$1,275; 65, Erie Foundry Company, Erie, Pa., \$1,520; 74, Fox Brothers & Co., N. Y., \$1,449 and \$1,524; 100, International Electric & Engineering Company, New York, \$1,625; 123, Manning, Maxwell & Moore, New York, \$1,280; 146, Niles-Bement-Pond Company, New York, \$1,226; 183, Joseph T. Ryerson & Son, Chicago, Ill., \$1,656; 187, William Sellers & Co., Philadelphia, Pa., \$1,485 and \$1,175; 207, Vermilye & Power, New York, \$1,250.

Class 3.—One radial drilling machine—Bidder 48, W. R. Colcord Machinery Company, St. Louis, Mo., \$1,600 and \$1,700; 74, Fox Brothers & Co., New York, \$1,385, \$1,460, \$1,495, and \$1,570; 75, Frevert Machinery Company, New York, \$1,518 and \$1,592; 123, Manning, Maxwell & Moore, New York, \$1,510; 146, Niles-Bement-Pond Company, New York, \$1,499; 155, C. T. Patterson Company, New Orleans, La., \$1,650 and \$1,754; 165, Prentiss Tool & Supply Company, New York, \$1,570 and \$1,675; 206, Vandyck-Churchill Company, New York, \$1,565.

Class 4.—One planer—Bidder 48, W. R. Colcord Machinery Company, St. Louis, Mo., \$1,500; 68, Fairbanks Company, New York, \$1,365; 74, Fox Bros. & Co., New York, \$1,374 and \$1,335; 75, Frevert Machinery Company, New York, \$1,449 and \$1,537; 80, Garvin Machine Company, New York, \$1,475; 123, Manning, Maxwell & Moore, New York, \$1,325; 133, Motley Green & Co., New York, \$1,310; 146, Niles-Bement-Pond Company, New York, \$1,437; 155, C. T. Patterson Company, New Orleans, La., \$1,260 and \$1,565; 165, Prentiss Tool & Supply Company, New York, \$1,133 and \$1,326; 187, William Sellers & Co., Philadelphia, Pa., \$1,835; 206, Vandyck-Churchill Company, New York, \$1,300, \$1,410 and \$1,465.

Class 5.—One engine lathe—Bidder 48, W. R. Colcord Machinery Company, St. Louis, Mo., \$3,300, \$3,400 and \$3,575; 75, Frevert Machinery Company, New York, \$1,898 and \$2,449; 105, I. H. Johnson, Jr., Company, Philadelphia, Pa., \$3,947; 123, Manning, Maxwell & Moore, New York, \$2,339 and \$2,500; 133, Motley Green & Co., New York, \$2,350; 146, Niles-Bement-Pond Company, New York, \$4,410; 165, Prentiss Tool & Supply Company, New York, \$3,321 and \$3,586; 194, Springfield Machine Tool Company, Springfield, O., \$2,600; 206, Vandyck-Churchill Company, New York, \$2,415.

Class 6.—One engine lathe—Bidder 48, W. R. Colcord Machinery Company, St. Louis, Mo., \$1,550; 75, Frevert Machinery Company, New York, \$1,096 and \$1,393; 89, Hendey Machine Company, Torrington, Conn., \$1,883; 105, I. H. Johnson, Jr., Company, Philadelphia, Pa., \$1,593; 123, Manning, Maxwell & Moore, New York, \$1,570; 133, Motley Green & Co., New York, \$1,275; 146, Niles-Bement-Pond Company, New York, \$1,597; 165, Prentiss Tool & Supply Company, New York, \$1,694; 169, Rahn-Carpenter Company, Cincinnati, Ohio, \$1,176; 194, Springfield Machine Tool Company, Springfield, Ohio, \$1,275; 206, Vandyck-Churchill Company, New York, \$1,565.

Class 7.—One double punch and shear—Bidder 19, Bertsch & Co., Cambridge City, Ind., \$1,860; 47, Cleveland Punch & Shear Works, Cleveland, Ohio, \$1,435 and \$2,100; 48, W. R. Colcord Machinery Company, St. Louis, Mo., \$1,675; 74, Fox Bros. & Co., New York, \$1,898, \$1,599 and \$1,405; 75, Frevert Machinery Company, New York, \$2,211; 119, Long & Allstatter Company, Hamilton, Ohio, \$1,275; 123, Manning, Maxwell & Moore, New York, \$1,865; 157, Henry Pels Company, New York, \$1,550; 123, Joseph T. Ryerson & Son, Chicago, Ill., \$1,575; 206, Vandyck-Churchill Company, New York, \$1,710; 214, Wickes Brothers, Saginaw, Mich., \$2,169.58; 216, Williams, White & Co., Moline, Ill., \$1,040, \$1,260 and \$1,630.

Class 8.—One universal crank shaper—Bidder 48, W. R. Colcord Machinery Company, St. Louis, Mo., \$750; 68, Fairbanks Company, New York, \$695 and \$460; 74, Fox Bros. & Co., New York, \$570 and \$625; 75, Frevert Machinery Company, New York, \$658 and \$537; 89, Hendey Machine Company, Torrington, Conn., \$628; 103, L. M. Jenne, Trenton, N. J., \$700; 146, Niles-Bement-Pond Company, New York, \$725 and \$476; 164, Potter & Johnston Machine Company, Pawtucket, R. I., \$834; 165, Prentiss Tool & Supply Company, New York, \$866; 167, Queen City Machine Tool Company, Cincinnati, Ohio, \$895; 194, Springfield Machine Tool Company, Springfield, Ohio, \$652; 206, Vandyck-Churchill Company, New York, \$876 and \$715.

Class 9.—One sliding head drill press—Bidder 68, Fairbanks Company, New York, \$210; 74, Fox Bros. & Co., New York, \$120; 123, Manning, Maxwell & Moore, New York, \$230; 146, Niles-Bement-Pond Company, New York, \$225.

Class 10.—One pipe threading and cutting machine—Bidder 24, W. Bingham Company, Cleveland, Ohio, \$550.79; 60, Drew Machinery Agency, Manchester, N. H., \$1,120 and \$378; 74, Fox Bros. & Co., New York, \$1,074 and \$572; 75, Frevert Machinery Company, New York, \$567; 123, Manning, Maxwell & Moore, New York, \$1,073; 146, Niles-Bement-Pond Company, New York, \$855; 191, John Simmons Company, New York, \$551.65; 206, Vandyck-Churchill Company, New York, \$1,235 and \$1,690; 207, Vermilye & Power, New York, \$274.80.

Class 11.—One single head bolt cutter—Bidder 31, H. B. Brown Company, East Hampton, Conn., \$594; 60, Drew Machinery Agency, Manchester, N. H., \$908; 68, Fairbanks Company, New York, \$855; 74, Fox Bros. & Co., New York, \$675; 75, Frevert Machinery Company, New York, \$859; 113, Landis Machine Company, Waynesboro, Pa., \$800 and \$840; 123, Manning, Maxwell & Moore, New York, \$830; 155, C. T. Patterson Company, New Orleans, La., \$888; 165, Prentiss Tool & Supply Company, New York, \$663; 206, Vandyck-Churchill Company, New York, \$810.

Class 12.—One cold saw—Bidder 73, George S. Fowler, Washington, D. C., \$615; 74, Fox Bros. & Co., New York, \$759 and \$834; 146, Niles-Bement-Pond Company, New York, \$435, \$836 and \$972; 165, Prentiss Tool & Supply Company, New York, \$684; 168, Quincy-Manchester Sargent Company, Plainfield, N. J., \$615; 183, Joseph T. Ryerson & Son, Chicago, Ill., \$640; 206, Vandyck-Churchill Company, New York, \$650, \$710 and \$800.

Class 13.—One drill grinder—Bidder 48, W. R. Colcord Machinery Company, St. Louis, Mo., \$120; 68, Fairbanks Company, New York, \$115; 74, Fox Bros. & Co., New York, \$153, \$157 and \$124; 75, Frevert Machinery Company, New York, \$142; 123, Manning, Maxwell & Moore, New York, \$162; 187, William Sellers & Co., Philadelphia, Pa., \$290 and \$345; 206, Vandyck-Churchill Company, New York, \$60, \$150 and \$155.

Class 14.—One valve reseating machine—Bidder 24, W. Bingham Company, Cleveland, Ohio, \$175; 60, Drew Machinery

Agency, Manchester, N. H., \$179.50; 67, Excelsior Equipment Company, Pittsburgh, Pa., \$150 and \$175.75; 74, Fox Bros. & Co., New York, \$175; 107, E. F. Keating Company, New York, \$250; 111, Knox & Bro., New York, \$175; 123, Manning, Maxwell & Moore, New York, \$175; 132, Montgomery & Co., New York, \$175; 133, Motley, Green & Co., New York, \$175; 177, J. B. Roache, New York, \$175; 189, Sherman-Brown-Clements Company, New York, \$175.

Class 15.—One duplex emery grinder—Bidder 74, Fox Bros. & Co., New York, \$256; 75, Frevert Machinery Company, New York, \$249; 207, Vermilye & Power, New York, \$179.50.

Class 17.—Two portable cylinder boring machines—Bidder 24, W. Bingham Company, Cleveland, Ohio, \$940; 60, Drew Machinery Agency, Manchester, N. H., \$1,027; 74, Fox Bros. & Co., New York, \$523; 75, Frevert Machinery Company, New York, \$870; 133, Motley, Green & Co., New York, \$900; 165, Prentiss Tool & Supply Company, New York, \$555.

Class 18.—One portable hydraulic crank pin and small wheel press—Bidder 36, Camden Iron Works, Camden, New Jersey, \$590; 74, Fox Bros. & Co., New York, \$649; 123, Manning, Maxwell & Moore, New York, \$713; 181, H. A. Rogers Company, New York, \$495; 206, Vandyck-Churchill Company, New York, \$470.

Class 21.—Two boiler feed pumps—Bidder 10, American Steam Pump Company, New York, \$170.26; 26, George F. Blake Manufacturing Company, New York, \$90.28; 58, D'Olier Engineering Company, Philadelphia, Pa., \$139 and \$157; 60, Drew Machinery Agency, Manchester, N. H., \$136 and \$164; 69, Fairbanks, Morse & Co., Chicago, Ill., \$125 and \$140; 74, Fox Bros. & Co., New York, \$127.90; 78, Gardner Governor Company, Quincy, Ill., \$150; 123, Manning, Maxwell & Moore, New York, \$325; 133, Motley, Green & Co., New York, \$150; 134, National Electrical Supply Company, Washington, D. C., \$254; 155, C. T. Patterson Company, New Orleans, La., \$108; 207, Vermilye & Power, New York, \$97.80.

The following bids were opened May 19 for machinery for the navy yards:

Class 1.—One milling machine—Bidder 135, Frevert Machinery Company, New York, \$1240; 162, Harron, Ricard & McCone, San Francisco, Cal., \$1,318; 262, Manning, Maxwell & Moore, New York, \$1,325.

Class 36.—Twelve electric drills—Bidder 61, Chicago Pneumatic Tool Company, New York, \$1,233; 73, Cincinnati Electric Tool Company, Cincinnati, O., \$307.50 per; 74, James Card, Jr., Electric Company, Louisville, Ky., \$1,332; 104, De Zousche, Hanson & Co., Philadelphia, Pa., \$1,029; 135, Frevert Machinery Company, New York, \$1,482; 142, R. W. Geldart, New York, \$1,224; 162, Harron, Ricard & McCone, San Francisco, Cal., \$1,161 and \$1,198.80; 178, Hisey-Wolf Machine Company, Cincinnati, Ohio, \$1,530 and \$15,590; 227, Knox & Bro., New York, \$1,530; 262, Manning, Maxwell & Moore, New York, \$1,530; 329, Pacific Tool & Supply Company, San Francisco, Cal., \$1,212; 416, United States Electric Tool Company, Cincinnati, Ohio, \$1,290 and \$1,332.

Class 102.—One duplex hydraulic pump—Bidder 20, Buffalo Forge Company, Buffalo, N. Y., \$1,799; 40, Bethlehem Steel Company, South Bethlehem, Pa., \$3,700; 53, Blake & Knowles Steam Pump Company, New York, \$2,987.50 and \$2,230.50; 97, Drew Machinery Agency, Manchester, N. H., \$2,790 and \$2,295; 100, D'Olier Engineering Company, Philadelphia, Pa., \$2,435; 101, M. F. Davidson, Brooklyn, N. Y., \$2,950; 125, Fairbanks Company, New York, \$2,275; 295, National Electrical Supply Company, Washington, D. C., \$1,785; 320, Platt Iron Works, Dayton, Ohio, \$2,500; 431, Warren Steam Pump Company, Warren, Mass., \$2,200 and \$2,250.

Under bids opened March 30, Circular No. 429, the Wood Drill Works, Paterson, N. J., has been awarded class 1, 25 rock drills and spare parts, \$6660.38, for the Isthmian Canal Commission.

The following awards have been made for supplies for the navy yards, bids for which were opened April 21:

Lucas Machine Tool Company, Cleveland, Ohio, class 141, one boring, drilling and milling machine, \$2,675.
Cleveland Punch & Shear Works, Cleveland, Ohio, class 161, one guillotine frame bar shear, \$950.

Under bids opened April 20, Circular No. 434, for supplies for the Isthmian Canal Commission, Fox Bros. & Co., New York, have been awarded class 3, one belt driven punch, \$697; class 4, one power shear, \$317.

Trade Publications.

Asbestos Felt.—H. W. Johns-Manville Company, New York, Folder. Advertises a fibrous asbestos felt adaptable as an insulator against heat and cold and for fireproofing purposes.

Turret Lathes.—Gisholt Machine Company, Madison, Wis. Loose-leaf, pages 83 and 84. Shows a method of chucking a gas engine cylinder and illustrates the Gisholt lathes in the plant of the Landis Tool Company, Waynesboro, Pa.

Gears.—Boston Gear Works, Norfolk Downs, Mass. Catalogue E1. This is a general gear catalogue of 87 pages, booklet size, showing nearly everything made in the way of small gears. Safety steering devices for automobiles, motor boats, &c., are illustrated and described, as well as roller link chains, sash chains, joint couplings and other specialties. Some useful tables are given, together with prices.

Mining Equipment and Coal Dealers' Supplies.—H. B. Sackett Screen & Chute Company, Chicago, Ill. Catalogue, 6 x 9 in., 63 pages. Coal mine supplies, such as conveyors, coal buckets, hoisting tubs, coal breakers and mine cars and screens are shown. The company also makes coal dealers' supplies, such as picks, baskets, shovels and chutes. Most of its principal lines are illustrated.

Gear Cutting Machines.—Eberhardt Brothers, Newark, N. J. Circulars. One describes the company's No. 2A automatic spur gear cutting machine, designed for cutting light and medium class spur gears. The machine has a 28-in. maximum swing and the

feed screw operates to draw the cutter carriage, giving smooth feed and eliminates vibration. The other circular shows the No. 3 machine, which is similar but larger, being designed for spur gears, which will swing an actual diameter of 40 in. This machine is furnished with all necessary attachments.

Steel.—Colonial Steel Company, Pittsburgh, Pa. Three booklets. Advertise Red Star, Colonial and other tool and drill steels made in various shapes. One of these booklets, besides listing the various steels the company has to offer, gives useful classification tables. Another lists the steel in the company's New York warehouse ready for delivery on February 1, and a third is devoted to vanadium steel with directions for treating the several grades, and price-lists.

Steam Turbine Machinery.—De Laval Steam Turbine Company, Trenton, N. J. Bulletin No. 501. Describes several types of turbine and motor driven machinery, including dynamos, blowers and centrifugal pumps.

Welding Apparatus.—Goldschmidt Thermit Company, 90 West street, New York. Booklet entitled "Shop Instructions for the Use of Thermit in Repair Work." Besides containing general directions for using the company's apparatus, directions for repairing locomotive parts and motor cases are given, together with valuable tabulated data. The volume is bound in cloth and is illustrated with views calculated to assist operators in making repairs.

Motors.—Crocker-Wheeler Company, Ampere, N. J. Booklet No. 99. Reprint of an article published in *The Iron Age* January 23, 1908, describing the Saucon plant of the Bethlehem Steel Company, with special reference to the application of electric motors to the machinery in that plant.

Steam Specialties.—Strong, Carlyle & Hammond Company, Cleveland, Ohio. Catalogue, 6 x 9 in., 43 pages. Treats of controllers, pump governors, boiler feed regulators, traps, valves and other steam specialties. Detailed piping plans show the application of these specialties and other drawings of installations. Price-lists, tables of dimensions, capacities, &c., are also given.

Machine Tools.—Burke Machinery Company, Cleveland, Ohio. Folder and two inserts for a loose-leaf catalogue. These show a new rotary cutting off saw, which is made in 12 and 20 in. sizes, and an automatic two-spindle milling machine, described in *The Iron Age*, March 19, 1908, which is built especially for typewriter factories and is so arranged that one operator can run several machines, it being necessary only to place the work in its jig, throw in the lever, and the machine will finish the operation and stop.

Engineering Specialties.—Lunkenheimer Company, Cincinnati, Ohio. 1908 catalogue; 564 pages. Covers the company's complete line of valves, injectors, whistles, lubricators, oil and grease cups and steam specialties, and including a number of new products. A very complete index locates the various specialties. Several pages are devoted to illustrations of the interior of the plant. Recent additions include a large brass foundry of over 154,000 sq. ft., of concrete construction, a concrete garage, and a factory containing over 40,000 sq. ft. Of special value to power plant operators and engineers is a section of nearly 100 pages giving tables and useful data.

The British Patent Law Hurts Americans.

A news dispatch from London, dated May 26, says: Representations have been made in the foreign office by Ambassador Reid, with a view to securing a modification of the new patent law of Great Britain. This law was introduced by David Lloyd-George, then president of the Board of Trade, and goes into effect on July 28. It provides for the revocation of all patents unless the actual process is carried on in the United Kingdom. Owners of American patents contend that this act will work a hardship upon them, and, as the United States protects all patents, whether American or foreign owned, they argue that Americans should receive equal treatment in Great Britain. The foreign secretary, Sir Edward Grey, will find great difficulty in dealing with this matter, as the Liberal government has taken considerable credit to itself for passing this act, which is one of the most popular of its administration. The tariff reformers assert that it is a direct step toward the protection of British industries.

Kansas is crying for help, the State Free Employment Agent at Topeka having advertised for 21,500 men and 1195 teams to assist in harvesting wheat in June. The harvest is expected to begin on the southern edge of the State about June 10.

HARDWARE

MANY manufacturers have met the problem of reducing production during the business depression with much greater skill than was shown in other similar periods of the country's industrial history. Not only have better methods been employed in putting manufacturing on an economical basis under conditions which from the very suddenness of their advent were the harder to meet, but there has been more careful regard for the welfare of employees. Enforced idleness for many men and women was inevitable; economic conditions were such that it could not be otherwise. But the effort has been to make the burden as light as possible for the maximum of people, and the results have been far beyond anything that was achieved in this direction in the past. Business ends have entered into the solution of this side of the general problem; the advantages resulting from a considerate treatment of the personnel of an industrial organization are obvious. Yet motives of pure philanthropy have constituted a very important element, and probably the most important in a great majority of cases.

A common policy has been to keep working forces as large as possible. Curtailment has been through shorter hours. The many establishments that have tried this method agree that it has worked out well. It has been better for both employer and employees to operate with 200 hands three days a week than to run full time with 100. Twice as many people received half their regular wages as compared to the number who would have earned full pay if the six days' schedule had prevailed. In a great many works curtailment had to go farther than this, however. The number of people on the payroll had to be reduced, and in this employers have shown a wise discrimination. Everything being equal the married men and others having families dependent upon them were given preference. In many other ways employers have endeavored to stand between their people and want. In villages where manufacturers own the houses occupied by their employees concessions have been made in rents. Two such cases are those of the Draper Company, Hopedale, Mass., and the Whitin Machine Works, Whitinsville, Mass., both large builders of textile machinery, which have permitted those tenants who are out of work, or whose incomes are seriously impaired, to live on in their homes free of rent. The individual circumstances of employees have been carefully scrutinized, that the labor which still remained to be done should go to those needing it most. The man who is known to be able to keep along without his wages is laid off. He may have a small farm, or be otherwise partially independent, while another equally deserving and capable man may have no other source of income than his factory work. The man who owns his own home fared better than his fellows of known roving nature.

During the period of great industrial prosperity every manufacturing establishment accumulates a certain percentage of undesirable help. There are the incompetents, whose labor is not up to the standard desired. There are those of unsteady habits, who cannot be depended upon to work constantly. There is that peculiar class of men who act as the yeast to create the ferment of dissatisfaction; the agitator or malcontent, who strives to

establish and widen the gap between capital and labor. The manufacturer in inspecting his payroll in preparation for cutting down expenses finds out the men who have been marked as undesirables. They go early, while those who have been faithful and satisfied, steady and competent, are retained. In the latter class the employer maintains the nucleus of the force which will be necessary when business shall become active again. Such a body of working people, carefully culled of the undesirables, is a first rate asset in business. Upon it can be built a good, economical industrial organization.

A business depression is apt to mark the close of the careers of old employees. Manufacturing concerns that have been in business for many years accumulate upon their payrolls the names of men whose days of usefulness have passed and who are in a sense pensioners. If the force is to be diminished they must be laid off with the others. The effort, however, is often made to give such old hands work suitable to their ability, such as janitor service or operating an elevator or doing odd jobs, for without their wages they might be left without resources. They may not have been forehanded by nature, or may have been unable through circumstances to lay aside something for their old age, and may have no child or others to care for them. Their fate might be an unfortunate one. While business in the abstract is soulless, very many times in practice consideration for employees has an important place. The relations of employers and their old workmen are frequently governed in good part by sentiment, and it is probably the exception when a veteran employee finds himself destitute or a public charge.

Condition of Trade.

While May closes with no important change in the general condition it may safely be said that the past week has been one which is reasonably satisfactory to those who are looking along conservative lines for a gradual improvement in the situation. The promise for good crops does not appear to be negated notwithstanding some injury here and there by adverse weather conditions, and the indications taken all in all still point to fine harvests, subject of course to the many contingencies which lie in wait. The developments of the past week in regard to the Iron market, especially as related to the conferences between the great interests in this field, are fortunately favorable rather than otherwise. There appears to be no relaxing in the determination of the Steel Corporation and those who are working in harmony with it to continue the policy which they have been pursuing in maintaining prices notwithstanding the moderate volume of current business. Coupled with this there is a perceptible improvement in the demand for Pig Iron especially, but also for some of the finished products. In connection with this it is to be noted that there is no important reduction in the prices of Hardware products, with a continuance of more or less irregularity in a good many lines. There are, however, others in which quotations are maintained without material modification even though the demand is considerably less than normal. In view of the questioning in regard to the course of the

raw material, and especially in view of the wide spread between Pig Iron and the finished products, which are in turn the material out of which many goods are made, together with the uncertainty as to the course of business awaiting a return to more stable conditions, buyers are still acting very conservatively and purchasing in only such quantities as represent their early requirements. There seems to be a general agreement that stocks in the hands of both jobbers and retailers are well reduced and in many cases exceptionally low, so that there is a likelihood that frequent ordering will continue to characterize the trade, with the prospect that when business is materially quickened the demands upon manufacturers will be urgent.

Chicago.

While few, if any, manufacturers of Hardware lines are in receipt of orders sufficient to operate their plants at normal capacity, the degree of activity seen in the various industries of this character is by no means uniform. Some are fairly well occupied, while others are extremely quiet, being compelled in some instances to run on stock orders in lieu of incoming trade requirements. Generally speaking, those engaged in supplying goods for rural consumption are favored with a better volume of business than producers whose product is more directly related to and dependent upon the prosperity of mining, milling and other manufacturing enterprises. In no other direction is the halt in demand as abrupt and keenly felt as in railroad buying, in which instead of improving there is perhaps more hesitancy. Interested observers who have been watching the stringent curtailment of railroad purchases have reasoned that the movement would have reached the limit of safe conservatism ere this but thus far there is apparently no relaxation in the effort to effect economy through the purchasing departments. One very important outlet for a varied assortment of Hardware is therefore closely restricted with the result that a large amount of plant capacity relying on business from this source is necessarily inoperative. The warm sunshine and growing weather of the past week has favorably effected some lines in which the increasing number of orders seems directly traceable to this cause; but in so far as it was expected to inject new life and vigor into trade and start a wide spread forward movement the results are somewhat disappointing. Screen doors are in better demand, and though the season is well advanced recent orders have been fairly plentiful. The exceptionally rapid growth of grass promoted by protracted rains has materially helped the sale of Lawn Mowers; a very satisfactory run of reorders was experienced last week and more are in prospect. There is perhaps nothing in the line of Sporting Goods now in more active demand than Fishing Tackle and Angling Outfits. Curiously enough the general dullness is in a way helpful to the sale of such goods since many persons who are ordinarily too busy to indulge in the sport now find leisure time to go fishing. Three or four large local buildings are taking figures on the Builders' Hardware required in their construction, and it is needless to say that competition for this business is very keen. Notwithstanding the low price of Pig Iron and Cast Scrap Sash Weights are being maintained at around \$21, but like other material entering into building construction the demand for them is only fair.

Nashville.

GRAY & DUDLEY HARDWARE COMPANY.—Business in this section continues to be about the same as reported in our last letter to you. While a fairly good volume of orders is coming in every day and every week, at the same time we are bound to admit that the Hardware business generally throughout the South is not up to the usual standard.

Merchants are buying conservatively in all lines, and are carrying small stocks. They are not disposed to anticipate their wants, or to buy any more than they are absolutely in need of. In the larger towns and cities trade is the duller, and the best volume of business that

we are getting now is coming from the general merchants out in the country and the smaller villages.

We are glad to say that the crop prospects in the South are really excellent. Corn, wheat, oats and cotton are all looking fine, and everything indicates without any bad luck, we will have splendid crops this season. If the crops turn out well we believe that fall and winter business will be good. While we do not think it will be up to what it was last fall before the panic, at the same time it will be satisfactory. Notwithstanding prices are inclined to be a little weak in some lines, we do not hear of any special cutting. Manufacturers are not making any great effort to force goods on the market, and jobbers and retailers are displaying judgment and discretion and maintaining prices better than we had anticipated. Collections are very good.

NOTES ON PRICES.

Wire Nails.—The somewhat general expectation of the trade that prices on Wire and Wire products might be reduced at the meeting of the steel interests, held on the 21st inst., was not realized. On the contrary, prices on Iron and Steel products were reaffirmed. Purchases continue to be made on conservative lines and only near-by needs appear to be covered by current orders. The market is referred to as steady in tone. Quotations for base sizes continue as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers.....	\$2.05
Carload lots to retail merchants.....	2.10

New York.—Nail houses and jobbers are carrying stocks just sufficient to supply the wants of their customers, who in turn are buying in such small lots as are necessary to keep stocks light and assorted. Regular quotations are on the basis of \$2.40 per keg for small lots at store.

Chicago.—New business is coming in slowly, a marked decline in volume being noted in the past week. Expectation that a reduction of prices would be announced following the meeting held in New York last week was quite general. Whether or not buying would have been stimulated by such action is an open question, but that the continuance of the present policy will not produce this result seems likely. Buyers are apparently firmly committed to the policy of buying only in small lots for actual needs, and now that the dull months are at hand there is every prospect of an extremely quiet movement through the midsummer season. We are advised that the principal producers are firmly adhering to regular price schedules. Quotations are as follows: \$2.23 in car lots to jobbers, and \$2.28 in car lots to retailers, with an advance of 5 cents for less than car lots from mills.

Pittsburgh.—The reaffirming of prices, not only on Wire Nails, but on all other forms of Iron and Steel by the Steel interests in New York on May 21 has imparted a decidedly stronger tone to the Wire Nail market, and all the leading producers are holding Wire Nails firmly at \$2.05 for base sizes, f.o.b. at mill. Whether the reaffirming of prices will lead to a heavier demand remains to be seen, but the tone of the market is undoubtedly stronger. Buyers continue to limit purchases to actual needs, but it is believed by some that there will be a freer buying movement in the very near future. Quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers.....	\$2.05
Carload lots to retail merchants.....	2.10

Cut Nails.—Existing prices were reaffirmed at the meeting of the Cut Nail Association held last week. While individual mills are selling at any price they desire, the hope was expressed that improved trade conditions will better the Cut Nail situation. Demand continues very light. The market is irregular, and concessions of 15 cents or more are being made on regular Steel Nail quotations, so that about \$1.85 for carload lots at mill is more representative of the market than \$2.05. Iron

Nails generally should command about 10 cents more than Steel.

New York.—The local Cut Nail market continues without important change, demand being very light. Regular quotations are on the basis of \$2.30 per keg, for small lots at store.

Chicago.—The demand for Cut Nails continues discouragingly quiet, and there is no immediate prospect of renewed activity in the industries comprising the principal consumers of this product. Concessions from the nominal prices quoted are obtainable on almost any kind of orders. Chicago quotations are nominally as follows: Iron Cut Nails, carloads, to jobbers, \$2.23; to retailers, \$2.28; Steel, to jobbers, in carloads, \$2.03; to retailers, \$2.08.

Pittsburgh.—Movement in Cut Nails is very light, buyers placing orders only for small lots and absolute needs. Some of the Cut Nail mills are closed down, while others are running only to partial capacity in order to keep down stocks. The general quotation on Steel Cut Nails is \$1.85, but \$1.80 or lower has been done in some cases. We quote Steel Cut Nails at \$1.85 f.o.b. Pittsburgh, for carload lots, and \$1.90 to \$1.95 in small lots. Iron Cut Nails take about 10 cents advance over Steel.

Barb Wire.—As the season is about over, new business received by the mills is light, while shipments on contract orders are in fair quantities. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Gal.
Jobbers, carload lots.....	\$2.20	\$2.50
Retailers, carload lots.....	2.25	2.55
Retailers, less than carload lots.....	2.35	2.65

Chicago.—Although very little new business is being placed, shipments against specifications are going forward in fair volume. Owing to the lack of stocks at the mills orders are not always being executed as promptly as buyers desire, and some little delay in shipments is frequently occasioned. Prices are reported to be firmly held by the mills. We quote as follows: Jobbers, Chicago, car lots, Painted, \$2.38; Galvanized, \$2.68; to retailers, car lots, Painted, \$2.43; Galvanized, \$2.73; retailers, less than car lots, Painted, \$2.55; Galvanized, \$2.85; Staples, bright, in car lots, \$2.35; Galvanized, \$2.65; car lots, to retailers, 10 cents extra, with an additional 5 cents for less than car lots.

Pittsburgh.—New business is very light, the season being over and buying practically suspended. The tonnage in Barb Wire placed with the mills this year was lighter than in the corresponding period last year. We are advised that prices are being firmly maintained by the mills. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Gal.
Jobbers, carload lots.....	\$2.20	\$2.50
Retailers, carload lots.....	2.25	2.55
Retailers, less than carload lots.....	2.35	2.65

Chicago.—Notwithstanding the favorable outlook for a record breaking hay crop, the volume of business from bale tie manufacturers has been disappointing. It is thought, however, that considerable more business will develop since buyers have been keeping close to present requirements. Fence manufacturers are ordering only in small lots, and are making no purchases save for current needs. Regular prices are reported as applying to all transactions by the mills. Quotations are as follows: In car lots, to jobbers, \$2.08, f.o.b. Chicago, and to retailers, \$2.15.

Pittsburgh.—Consumers continue to restrict their orders to small orders for actual needs, and the amount of new tonnage being placed is light. As the Steel interests have reaffirmed prices on Wire Products, this may possibly lead to a heavier demand, as a good deal of tonnage was being held back in anticipation of a possible reduction in prices. Quotations are as follows, f.o.b. Pittsburgh, 60 days, 2 per cent. discount for cash in 10 days:

Jobbers, carload lots.....	\$1.90
Retailers, carload lots.....	1.95

Plain Wire.—Conditions in the Plain Wire market continue as for some time, current requirements being reflected by a limited demand. Quotations per 100 lb. to

jobbers in carload lots are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days, the price to retailers being 5 cents additional:

Nos.....	6 to 9	10	11	12&12½	13	14	15	16
Annealed.....	\$1.90	1.95	2.00	2.05	2.15	2.25	2.35	2.45
Galvanized.....	\$2.20	2.25	2.30	2.35	2.45	2.55	2.95	3.05

Wheels and Woodstock.—No recent change has occurred in prices of Wheels and Wheel Stock, and no reduction is regarded as probable in view of the small margin of profit on the finished product. Quotations are consequently very firm and buyers, as a rule, are not expecting concessions. The demand has been fair, but materially less, of course, than for the same period last year. Business, however, is referred to by manufacturers as improving gradually, and they are anticipating that normal conditions will be reached in the near future, when they expect an ample supply of orders. It is regarded as a hopeful sign that very few, if any, of the Wagon manufacturers have reduced prices during the financial depression in order to facilitate the moving of stock. It is not considered that parties getting out Wheel Stock are asking exorbitant prices, especially as material is rapidly growing more scarce. Manufacturers are finding that the cost of production during the past six months has been just as high as during the preceding and more prosperous season, and in many cases the cost has been even higher. It is asserted that if demand had continued normal advances would certainly have occurred, since the stringency in the money market has made it difficult to finance lumbering operations and much less timber than usual has been got out.

Galvanized Ware.—Quotations on some lines of Galvanized Ware, notably Pails and Tubs, which have shown weakness recently, have again been considerably reduced, so that they are declared by manufacturers to be below cost. An advance in list prices approximating 5 per cent. has been made in Light Galvanized Pails, but this is more than offset by an increase in discount, which makes the net decline of these goods about 5 per cent. On Light Tubs, list prices have not changed, quotations being about 10 per cent. lower. In view of these changes the market to the general trade may now be represented by a discount of 10, 7½, 5 and 5 per cent. from the following revised list prices on light or regular Water Pails:

Quart	8.	10.	12.	14.	16.
Per gross.....	\$24.15	\$26.85	\$29.50	\$33.50	\$41.50

A change has also been made in list prices on Galvanized Oil Cans, which, however, has been offset by a corresponding change in discount.

Bright Wire Goods.—Indications are multiplying that the market for Bright Wire Goods is not in satisfactory condition. For some time it has been possible to obtain concessions on desirable orders, and it would now appear that there is little adherence to so-called established prices. A discount on Steel Wire Goods of 90 and 33 1-3 per cent. is now readily obtainable by average trade.

Rope.—Manufacturers see but little encouragement for the immediate future in the comparatively limited business which is offering or can be solicited. Orders are for small lots, as a rule, covering near by requirements. According to press reports a falling off in receipts of Manila Hemp may be anticipated, with consequent higher prices, while on the other hand the Sisal Hemp planters' pool is said to have gone to pieces which, if true, would indicate lower prices. The following quotations, for base sizes of Rope, fairly represent the market for small lots, but are not always adhered to on large orders: Pure Manila, 10 to 10¼ cents; lower grades Manila, 8 to 9 cents; Pure Sisal, 7½ to 7¾ cents; lower grade Sisal, 6½ to 7 cents; No. 1 Jute, ¼-in. and up, 6¼ cents; No. 2 Jute, ¼-in. and up, 5¾ cents.

Window Glass.—From the standpoint of prices conditions are becoming more unfavorable for manufacturers of Window Glass, resulting from the repeated reduction of prices of machine made Glass by the American Window Glass Company. It is understood that the company is very strict in regard to specifications and insist upon filling orders at its own convenience. However this may be, the hand blown factories, with large stocks and a dull

market, are in no position to dictate prices, while they are but poorly prepared to meet competition from a financial point of view. Prices are regarded as having reached a lower point than for years, if ever in the history of the trade. The American Window Glass Company's prices are represented by the quotation of 90 and 40 per cent. discount on single and 90 and 40 and 10 per cent. discount on double strength Glass, from manufacturers' list. Jobbers' quotations east of the Alleghenies and north of the Carolinas are reported as being 90 and 35 per cent. discount for single and 90 and 40 per cent. discount for double strength Glass, from jobbers' lists. South of the Carolinas quotations are said to be 5 per cent. higher. Western jobbers' prices are about 90 and 40 per cent. discount on single and 90 and 40 and 5 per cent. discount on double strength Glass, from jobbers' list. In estimating these quotations it must be borne in mind that the jobbers' list is about 25 per cent. higher than the manufacturers' list. A continuance of hot weather will possibly close most of the hand blown Glass factories.

Linseed Oil.—The market has considerable strength owing to the fact that crushers have comparatively light stocks of seed and oil. Seed is higher both in this country and Europe and an upward tendency in oil prices is anticipated, rather than lower ones. Buyers have yet shown little anxiety to provide for future requirements, and comparatively few have placed contract orders. Crushers generally do not appear anxious to enter contracts for deliveries further ahead than through July, while some western mills which are better supplied with seed are willing to accept contracts extending over longer periods. Local quotations are as follows: State and Western Raw, 42 to 44 cents; City Raw, 44 to 45 cents per gallon. Boiled Oil is 1 cent per gallon advance on Raw.

Spirits of Turpentine.—The trend of the market is toward lower, rather than higher prices, as demand is considerably below normal and receipts of the new crop of Turpentine at Southern points are heavy. This season usually is one of activity in Turpentine, but now business is exceedingly light. The New York market is represented by the following quotations: Oil Barrels, 45 to 45½ cents; Machine Made Barrels, 45½ to 46 cents.

Registers.—It is expected in the trade that an advance in hot air Registers, japanned, electroplated and bronzed, will take effect June 1. The amount of the advance is said to be 10 per cent., which will make the discount to average trade about 70 per cent. Established prices of leading manufacturers are usually shaded a little by two or three independent makers of Registers, whose output, however, is limited.

Wrought Strap and T-Hinges and Butts.—Prices on Wrought Strap and T-Hinges and Butts have maintained a noteworthy steadiness, although the volume of business has been light. Ruling quotations have lately been reaffirmed by leading manufacturers. Stocks in the hands of the trade are believed to be unusually small.

Sandpaper.—Manufacturers and large handlers of Sandpaper state that the volume of trade is not far below the normal, a fact which makes this line somewhat unique among commodities handled by the Hardware trade. Prices have been practically unchanged for some time, and quotations of manufacturers show a marked uniformity. The market on Flint and Emery Paper and Cloth may be represented in a general way by a discount of 50 and 10 per cent., and on Garnet Paper and Cloth by 25 per cent.

The Gooch-Edenton Hardware Company, Jackson, Tenn., has organized with a capital stock of \$50,000, and has purchased and taken over the G. C. Anderson Hardware stock. Among those interested are George R. Gooch, Vernon Edenton and W. H. Edenton.

The Nickel Hardware & Supply Company, Wausau, Wis., has been incorporated with a capital stock of \$20,000 by Robert J. Nickel, Fred M. Gennich and Herman A. Gennich.

International Rifle Match.

THE National Rifle Association of America has officially determined to send a Rifle team from the United States to compete in the Olympic matches at Bisley, England, next July, against the Riflemen of the world. As previously stated in these columns, the United States Cartridge Company offered to finance the entire expenses of the team, which offer was accepted by the National Association April 22. In consequence of some correspondence from other Ammunition manufacturers, the United States Cartridge Company renews its offer, modified to cover all or any part of the expenses as may be determined, some of the other Ammunition makers offering to contribute proportionally to the fund, with the provision that "the different Cartridge producers so contributing should submit Ammunition for an impartial test, and the best so proven only to be used by the team." After a full discussion of the situation, the National Rifle Association has decided to appeal for a public subscription for the expenses of the team, and divide pro rata among the Ammunition companies the amount necessary to make up the difference between the sum so subscribed and the team's expenses. The following resolution in regard to the proposed Ammunition test has been adopted by the association:

That the ammunition to be used by the United States Rifle team which will be sent to compete in the Olympic Games be determined by an exhaustive test of the different makes on a machine rest; that such test be carried on under the supervision and regulation of the subcommittee consisting of Generals Drann, Hall and Riggs; that the ammunition selected by reason of such test be used in the tryouts by the candidates for places on the team; that the four ammunition companies be invited to send a representative to be present at the test, and that said test begin on Monday morning, June 1, and be continued until the committee arrive at a final decision.

The tryout competitions will be held June 10 to 13, inclusive, at Camp Perry, Ohio, and the selection of successful competitors will be made June 13. The selected team is to sail on June 20, which will allow nine days' practice on the Bisley range before the matches.

The Herculever Company.

THE Herculever Company, 332 Broadway, New York, has lately been organized to manufacture a unique and effective device for removing the cover boards of packing boxes, cases, &c. This device, known as the Herculever Box and Case Opener, and the invention of I. N. Rogers of New York City, does not when properly used damage the cover boards and leaves the nails perfectly straight in the board, so that they can be driven out easily if so desired. The Herculever is covered by two patents and 12 patent claims, the second patent being still pending. The officers of the new company are F. Felt, president and general manager; Charles Glover, vice-president; A. H. Lamborn, treasurer, and C. B. Goding, secretary. The active management of the company will be under the direction of Mr. Felt, late of the Felt & Tarrant Mfg. Company, Chicago, and formerly with the Remington Typewriter Company, London, Monarch Typewriter Company, Syracuse, the Dey Time Register Company, Syracuse, and the Roneo Company, New York City. Mr. Felt has been a sales manager in different parts of the world for the past 15 years, and is familiar with every phase of the specialty business. Charles Glover, vice-president of the company, is president and director of the Corbin Screw Corporation, and a director in the American Hardware Corporation, P. & F. Corbin, Corbin Cabinet Lock Company and Corbin Motor Vehicle Company, all of New Britain, Conn. A. H. Lamborn, treasurer, is head of the large sugar brokerage house of A. H. Lamborn & Co., 106 Wall street.

W. S. Cox, Silver City, N. M., has incorporated under the style of W. S. Cox, Inc., with an authorized capital of \$50,000. The incorporators are W. S. Cox, H. J. Burgess and S. E. Pollock.

The Lind Hardware Company, Lind, Wash., has purchased a site on which it will erect a building for the accommodation of its Hardware, Stove, Implement and Sporting Goods store.

Export Topics.

IMPORTANCE OF FOREIGN TRADE.

BY A MANUFACTURER.

Concluding Article.

Prompt Shipments.

If desirable connections with foreign merchants are to be continued, shipments must be made as promised and the long travel considered. American manufacturers have frequently jeopardized their foreign interests by allowing the press of domestic business to unreasonably delay their export shipments.

Some Fallacies.

Occasionally the claim is made, without any verification, that the foreign countries are used as a dumping ground for what is obsolete or unsalable at home, and that very low prices are quoted for export. No manufacturer who is seeking a trade for the future attempts to make a start on out of date lines. The requirements of some countries demand heavier, less complicated and not so well finished goods, which can be produced at a lower cost than a similar article used in the domestic trade. The claim of low prices has been investigated several times without being substantiated. The principal manufactured articles having a large sale abroad yield a larger profit to the manufacturers than similar articles in the domestic trade. In this connection the matter of terms must be considered. At present a large percentage of American shipments are made on a cash basis. The large New York City export houses, who act as brokerage buyers for the foreign merchant, always buy for cash, although they may give the merchant extended terms of several months. Foreign manufacturers are granting longer terms than in past years, and the better class of merchants are insisting upon credit.

Territorial Control?

A noticeable part of the inquiries from abroad, is the almost universal demand made for the control of a very large territory, even when the inquirer is in no way equipped to solicit the business of so large an area, and manufacturers need to be wary about assigning exclusive rights to any important countries. This difficulty is increased by the general omission on foreign letter heads of the name of the country in which the merchant lives. Printed letter heads give only the name of the city or village.

Preferential Advantages.

American made goods are preferred in most countries because they embody a much higher type of technical knowledge and ingenuity; they are usually neater and lighter in construction, and are often better made in every respect; they are more durable and avoid troublesome complications. In short, the American article is frequently of much better quality or greater value for the price. These facts are so obviously true that even when foreigners attempt to duplicate an American article, the result is very crude, and they remain some years late in the development of any line.

Imitations.

Duplication in the most progressive foreign countries is widespread, as foreigners copy even to the labels, color of boxes, &c. These duplicates are usually soon discovered, as the article rarely compares favorably with the American product. All exporters should adopt trademarks or brands, which will be plainly intelligible to all classes of people, as this is a quick method of creating a continuous demand, and is somewhat of a safeguard against general duplication.

Meeting Conditions.

The most successful exporters are those who study the earning power and habits of the people and the articles used by them, and then introduce something that will produce better results. The change, however, must not be too radical, as there are always certain fixed habits

in all countries that cannot be changed without a long period of education. A manufacturer in investigating why the demand for a very desirable part of his tool line was not increasing more rapidly, discovered that the style of the Wood Handles was not satisfactory to certain foreign users, although in general use in other countries.

Foreign Competition.

The foreign manufacturer is constantly becoming a stronger competitor of American goods, but there is no reason why American manufacturers should hesitate to enter markets where they know foreigners secure a large business. By using the correct methods, a desirable and profitable business can usually be secured. American Locks and other Building Hardware lead wherever introduced, although where seen for the first time may create skepticism, because of being so much lighter and neater than foreign makes their strength is questioned. England and Germany are strong competitors of America in Hardware lines. England secures a particularly large trade on Blacksmith Hardware and Cutlery. Germany holds a strong position as manufacturer and exporter of Cutlery, various Edged Tools, Guns and Enameled Ware.

Various Fields for Exploiting.

Spain is a virgin field for American Hardware, as the trade is just now being developed. The dealers are supplied by the factories and jobbers of Europe. The trade on American Hardware in India is increasing, and American representatives are covering the country. English factories are supplying their own country with Forks, Hoes, Rakes, &c., and American trade is diminishing, although the quality and finish of the English product are inferior. Shipments of American Hardware and machinery into Mexico during 1907 amounted to over \$20,000,000. Of this amount Builders' Hardware, Saws, &c., exceeded \$1,000,000. There is considerable inquiry from Russian Poland for American Hardware and machine tools. Austria, England and Germany are the chief competitors, but it should be noted that there is a strong preference for any article made in America. Russia presents almost unlimited opportunities, but at present buys largely from European factories, because the latter's commercial methods are better known and extended credits are granted. Ecuador is increasing its purchases of American Hardware, and native stores are being equipped in a comparatively modern way.

American Hardware are Winning Its Way.

The fact that American Hardware is increasing in favor abroad is indicated by a comparison of export statistics. Since 1905 the annual exports of Builders' Hardware, including Locks, Hinges, Saws, Tools, &c., have increased \$3,000,000. The shipments during 1907 amounted to \$14,000,000. There has been a proportionate increase in the exports of Cutlery, Firearms, Safes, Scales, Stoves, Pipe and Fittings, &c.

The machine tool trade in foreign countries is immensely important and should be of interest to every American manufacturer. America exported during 1907, \$10,142,835 of metal working machinery, and \$1,386,381 of wood working machines. This is an increase over 1906 of 27 per cent. on metal working machines, and 48 per cent. on wood working machines. The shipments of mining machinery increased over 100 per cent.

Largest Purchasers.

The countries purchasing the largest volume of American metal working machinery, are, in the order of their importance, Germany, United Kingdom, France and Belgium. Many other countries are liberal buyers. While the shipments to Germany during 1907 amounted to over \$2,000,000, there was practically no increase over 1906 shipments. The other countries named increased from 30 to 40 per cent. German manufacturers are producing more efficient machines than in past years, and are now able to supply the requirements of ordinary shop work in their own country. Sales of American machines, however, continue to be large on tools of superior merit and high efficiency. American mechanical skill and ingenuity

are more highly developed, and produce machine tools capable of performing wider ranges of work at greater speed. American machine tools are recognized by the principal countries of the world as the product of a very high standard of technical knowledge, considerably in advance of the ideas of foreign designers. No other country has made such rapid progress in reducing the number of men required to operate machines, and in perfecting economical shop methods. Manufacturers will appreciate the advantages to be obtained by taking advantage of this high international reputation, in an effort to enlarge the market for their products. There certainly can be no better time than the present to consider the question of an active or more intelligent effort for export trade.

THE HOT SPRINGS CONVENTIONS.

THE Southern Hardware Jobbers' Association, C. E. Kersey, secretary, Richmond, Va., has issued its formal programme for the eighteenth annual convention, which will be held at Hot Springs, Ark., on June 9, 10 and 11, at the same time and place with the semiannual convention of the American Hardware Manufacturers' Association, the headquarters of both associations being at the Hotel Arlington. The opening session on the 9th will be as usual an open session, to which manufacturers and their representatives and other visitors are invited. Addresses of welcome to the State of Arkansas and city of Hot Springs, respectively, will be made by Governor Pindall and M. H. Jodd, Mayor of Hot Springs. Perhaps the most interesting feature of this session will be a general discussion of the subject, "The Recent Panic, Its Causes and Remedies." This discussion will be opened by a member of the Manufacturers' Association, who will be followed by J. D. Moore, Moore & Handley Hardware Company, Birmingham, Ala., as the representative of the Jobbers' Association.

On Wednesday afternoon, 10th, there will be a joint session of the two associations, the jobbers being the guests of the manufacturers. C. W. Asbury, president of the American Hardware Manufacturers' Association, will preside. The principal subjects for discussion at this joint session will be: 1. "Is the Policy of Protection in Its Broadest Sense, as Viewed by the Business Man, Detrimental or Advantageous to the Allied Hardware Interests of the Country?" and 2. "Should Not Associated Manufacturers Who Control Prices Protect the Jobber Against Decline on Stocks on Hand?" The consideration of each of these topics will be opened up in addresses by manufacturers whose names are not yet announced. On behalf of the jobbers W. W. Webber, Webber-Ayers Hardware Company, Fort Smith, Ark., will discuss the former subject, and W. F. Stephenson, Barnes & Miller Hardware Company, Memphis, Tenn., and R. F. Bell, Wm. Henry & R. E. Bell Hardware Company, Fort Worth, Texas, the latter.

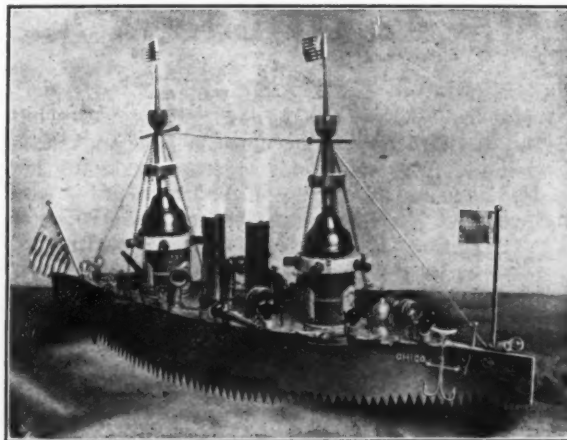
At the executive sessions of the Jobbers' Association held on Wednesday and Thursday mornings, papers will be read on the following subjects: "Importance and Benefits of Local Associations," by Harvey L. Anderson, Anderson Hardware Company, Atlanta, Ga.; "Why Should Not the Southern Hardware Jobbers' Association Have the Unqualified Support of Every Eligible Hardware Jobber in the South?" by Hugh Fox, Fox Brothers Hardware Company, Pine Bluff, Ark.; "How Shall We Increase the Profits on our Staple and Seasonable Goods?" by H. Young, Southern Hardware & Supply Company, Mobile, Ala.; "The Compensation of Traveling Men, and the Best Method of Handling Them," by J. Van Dorkum, Fones Bros. Hardware Company, Little Rock, Ark.; "The Best Methods of Departmentizing Business, and the Benefits to be Derived Therefrom," by S. Norvell, Norvell-Shapleigh Hardware Company, St. Louis, Mo. On Thursday morning also there will be a general discussion of the topic, "What Is the Best Method of Computing Profits and Arriving at the Cost of Doing Business."

F. D. Mitchell, secretary-treasurer American Hardware Manufacturers' Association, 309 Broadway, New York, is sending out postals to jobbers and manufacturers in which he requests information in regard to the

names of their representatives who will attend the Hot Springs conventions. This information is desired for the purpose of furnishing identification badges similar to those used at recent gatherings and displaying the name of the representative as well as the name and address of the company with which he is connected.

HARDWARE BATTLESHIP.

THE latest addition to the Hardware battleship fleet, which was not authorized by Congress, is the Chico, which was built by the Nichols Hardware Company, Chico, Cal. In the accompanying illustration she is shown lying in the show window of the company's store, doubtless waiting to fire a salute in honor of the arrival of the great fleet from the Atlantic, under command of



Hardware Battleship.

Admiral Evans. The hull of the vessel was made of a Cross Cut Saw, and Hose Nozzles represented the big guns. Fish Hooks afforded natural looking anchors, while Brass Jack and Ladder Chain formed cable chain and stays. The turrets are Mouse Traps, resting on cans of prepared Paint, with Oil Cans above for fighting tops. Other goods used in constructing the gallant ship included Nails, Round Head Screws, Cartridges, Galvanized Cleats, Coat and Hat Hooks, Stove Bolts, Oil Cups, Wire, Towel Bars, Sheet Brass and Copper Brass Knobs, Electric Sockets, Shoe Tacks, Nickel Plated Elbows and Pipe, Washers, Blind Hinges, Shutter Knobs, Nickel Clamps, Solder, &c. The display was lighted by different colored electric lamps.

THE ENTERPRISE ENAMEL COMPANY, Bellaire, Ohio, manufacturer of the Corona Roaster, states that this article, put on the market about a year ago, is meeting with quite a good demand, the company having recently filled large contracts from a number of jobbing houses. This Roaster is oval in shape, 18 x 11 in. in size and 7½ in. deep. Its construction is such that the bottom cannot touch the oven, so that meat may be cooked until tender without burning, the cover keeping every whiff of grease and moisture inside. It is made of one piece of steel, and, being seamless, there is no place for grease or other particles to accumulate. The company which manufactures other household utensils besides the Roaster is operating its plant practically full time.

DIXIE HARDWARE & FURNITURE COMPANY, Gibbsland, La., has been incorporated with a capital of \$25,000 to conduct a wholesale and retail business in Shelf and Heavy Hardware, Mill Supplies, Stoves, Implements, Sporting Goods, Harness, &c. A two-story brick store, 40 x 100 ft., affording 8000 ft. of floor space has just been completed.

F. E. MYERS & BRO., Ashland, Ohio, manufacturers of Pumps, &c., have lately opened bids for a substantial business block which they will build at a cost of about \$50,000. Work will be begun immediately.

CAMPAIGN AGAINST PARCEL POST CROWNED WITH SUCCESS.

FROM OUR SPECIAL CORRESPONDENT.

WASHINGTON, D. C., May 26, 1908.

THE Conference Committee, to which the annual Post Office Appropriation bill was referred after its passage by the Senate early last week, has reported the measure without the addition of a parcel post amendment of any kind and by the time this issue of *The Iron Age* reaches its readers the bill will have received the President's signature. In spite of an energetic attempt on the part of the advocates of numerous postal innovations to put through a special bill consolidating third and fourth class mail matter at the rate of 8 cents per pound, the movement has failed and the most extraordinary campaign relating to the postal service that has been conducted in Congress in 20 years has thus been brought to a termination entirely satisfactory to the retail merchants of the country.

Interesting Disclosures

have been made within the past few days concerning the desperate effort made by the officials of the Post Office Department to force into the Post Office Appropriation bill a provision for an experimental parcel post. Up to the moment that the bill was reported to the Senate from the Post Office Committee, the officials were hopeful that the Postmaster-General's comprehensive rural parcel post plan would be adopted. When the bill was placed on the Senate calendar it was found that all the Department's projects had been thrown out by the committee. Under ordinary circumstances the Department would have made no further attempt to interfere with the due course of legislation, but in this case the Postmaster-General decided to make an effort to force into the bill on the floor of the Senate an amendment to enable the Department to establish an experimental parcel post, and to this end he addressed an urgent communication to Chairman Penrose of the Senate Committee. Mr. Penrose was so fully convinced, however, that the Department's project was both unwise and untimely, that he refrained from laying the Postmaster-General's letter before the Senate until after the passage of the bill. He has since made the communication public, possibly at the request of the Department, which will now be able to utilize it as literature in the campaign which it is understood will be reopened when Congress reconvenes in December.

Conviction of the Post Office Committees.

It is doubtful if the reference in the Postmaster-General's communication to the experimental appropriation which resulted in the establishment of the rural free delivery, which is now costing \$40,000,000 a year, of which 80 per cent. is saddled upon the taxpayers at large, was a happy thought; in any event it provided a very strong argument against amendments based upon the Burnham or Lafean bills. Both the House and Senate Post Office committees are convinced that enough has been done for the farmers at the expense of the Federal treasury and that the retail merchants, who have suffered heavy inroads upon their business as the result of the unbridled extension of rural free delivery, should not be called upon to compete on more unequal terms with the big mail order houses.

Retailers' Effective Campaign.

The retailers in all lines have made an extraordinarily effective campaign against the Post Office Department's schemes and the evidence on file in both House and Senate committees is sufficient to demonstrate the absurdity of the claim that the proposed rural parcel post would be "a boom to the retail country merchant." Thousands of protests from this class of merchants have been received, each bearing unmistakable evidence of its genuineness and its individual source. On the other hand, the petitions in favor of the innovation have come almost exclusively from one prominent organization of farmers and belong to the "machine-made" category. When the extraordinary methods employed by the Post Office Department to stimulate public sentiment in favor of a rural parcel post are borne in mind the victory of the retailers is little less than phenomenal.

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Georgia Retail Hardware Association.

THE third annual convention of the Retail Hardware Association of Georgia, which was held at Indian Springs, Ga., May 19, 20 and 21, was very successful, and chronicled a marked advance in association work in that State. The attendance was large and representative and the programme varied and interesting, while the presence of men prominent in the trade had much to do with the pleasure and usefulness of the gathering. Important action looking to the welfare of the association was taken and plans matured to increase its interest and usefulness to the merchants of the state.

The Opening Session.

The convention was called to order on Tuesday, May 19, at 2.45 p. m. by President Tillman, a goodly number of delegates being in attendance. After an invocation by the Rev. Mr. Mitchell, the president delivered the following address:

In the face of the general depression, I am glad to see that so many of my brother retail merchants are yet able to gather a sufficient number of dollars to defray their expenses to this our third annual convention. It is gratifying to note further that we have with us also representatives of the trade from all over the Union. I take occasion just here to thank them for having devoted this much of their valuable time to meet and mingle with us.

If I properly understand the exact meaning of this organization it is for the promotion of a kindlier feeling among the retail Hardware merchants, to promulgate certain principles for our mutual good. Proceeding upon the theory that everybody knows more than anybody, I would admonish you to attend these conventions, thereby keeping in touch with what is going on around you, and by your presence and influence assist an organization that is for you and for your ultimate welfare.

Parcel Post.

A question that should engage our attention at this session is the matter of a parcel post. I am pleased to inform you that our present Congress failed to carry an appropriation for this measure. Our esteemed friend, M. L. Corey, led the opposition to this appropriation, and in belief of this organization I tender to him my heartfelt thanks for his efforts. While the Hardware trade would probably suffer less than any other under the parcel post system, it would be more or less affected by it. And while we won out before it behooves us to guard with jealous care the fruits of our victory. The next administration will no doubt force another contest.

Mutual Insurance.

Another matter to which I would call your attention is that of insurance. The chairman of that committee is in a position to report at this convention a plan that will mean the saving of a considerable sum annually to our members.

Jobbers Selling to Consumers.

Again, we should condemn in no uncertain terms the practice of a few local jobbers quoting and selling direct to consumers. It is manifestly unfair to the retailer in the small towns, and does not prove any great benefit to the jobber. This system must and will be decried by this organization. So far as I am informed this does not extend over all the territory covered by us, but there are sporadic cases.

Garnishment Law.

I would suggest just here that we co-operate with retail merchants in enacting into law at the earliest possible day a garnishment process whereby we would be able to retain, say, 40 per cent. of a laborer's monthly stipend. This measure would have to be handled carefully in order that no hardship might be worked upon an unfortunate fellowman. But I dare say that all of us are carrying accounts against good people (so to speak), and yet they belong to that class who are too good to pay. Of course, I make this statement advisedly, and am re-

ferring to those risks particularly in my own territory. Where sickness or death had invaded a home we would be governed in the enforcement of this law purely upon conditions, with no intent to make the worthy suffer.

State Legislation.

In this connection I would further suggest that this organization have a paid representative to attend all sessions of the Legislature and watch out for our interests. Should a matter arise that would prove inimical to us he could advise our secretary, who would in turn take it up with the members, and they could call on their respective legislators, explaining to them the disadvantages of such a measure. Our representatives as a rule are the best men in their community, and having the welfare of their townsmen at heart would be loath to champion a cause that would retard development in their localities.

Railroad Commission Courtesies.

I am fully aware that this is no political mass meeting and I have no desire to inject anything into it of that nature, but in view of the many courtesies shown us by the Railroad Commission in the matter of adjustments of shortages and overcharges, we should tender them a resolution of thanks.

Fifty Per Cent. Increase in Membership.

In conclusion I want to say that we have increased in membership more than 50 per cent. during the past year. I would not be so vain as to arrogate to myself all of the honor, but I do assure you that I have worked honestly and faithfully for the organization in all of its departments. I have (with the assistance of two stenographers) endeavored to inspire you with enthusiasm sufficient to get you to come here. Once here, where we could discuss subjects face to face, I have no fear as to the final result. We are banded together for common good; your misfortune would be my sorrow, your success my greatest joy. And though we should not come within sight of the castles of our dreams may we always be found advancing the interests of others and of ourselves.

Tuesday Evening Session.

At the session on Tuesday evening, which was of an executive character, some matters connected with association work were taken up under the suggestion of reports of the secretary-treasurer and the Auditing and other committees. The consideration of questions which had been placed in the Question Box was then taken up. While it was in progress M. L. Corey, national secretary, whose presence is so highly appreciated at these meetings, entered and made an excellent address abounding in practical suggestions. R. R. Williams, Hardware Editor of *The Iron Age*, was also presented to the delegates and made a brief acknowledgment of the courteous and kindly welcome extended him.

Wednesday's Sessions.

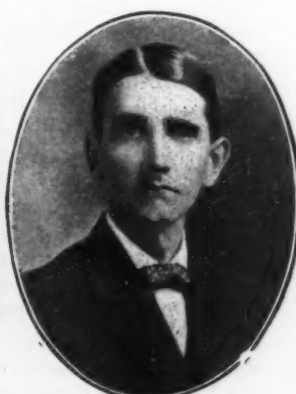
Wednesday may be referred to as the high day of the convention. Both the morning and afternoon ses-



C. W. TILLMAN.



R. W. HATCHER.



THOS. W. BROBSTON.

sions were devoted largely to addresses by the guests of the association, representing the jobbing trade, the trade press and the control of public utilities. Addresses were thus made during the forenoon session by R. W. Shapleigh of the Norvell-Shapleigh Hardware

Company, R. R. Williams of *The Iron Age*, and L. E. Dietrich of the American Steel & Wire Company, New York. In the afternoon the speakers were Col. Morris B. Belknap of the Belknap Hardware & Mfg. Company, M. L. Corey and Judge George Hillyer of Atlanta, who was very happily introduced by Mr. Woodruff, who has taken an active interest in freight matters, and has been influential in framing the policy of the association in regard to them. We regret that the pressure on our space does not permit us to give a full report of the more important of these addresses, but extracts will be found in the following columns.

Committees.

On the first day of the convention the following committees were appointed by the president:

NOMINATIONS.—T. W. Brobston, Z. B. Hamilton, J. J. Golden, W. G. Raines, George E. McRae.
PLACE OF MEETING.—J. R. Hall, S. G. Slack, L. L. Bishop.
GRIEVANCES.—W. W. Robinson, R. S. Anderson, S. D. Zuber, Jr.
AUDITING COMMITTEE.—E. E. Dekle, H. G. Stevens, K. T. Wight.
RESOLUTIONS.—C. B. Thomas, T. G. Green, H. C. Briggs.
BY-LAWS AND CONSTITUTION.—G. W. Woodruff, P. M. Harley, D. E. Hogshed.

A committee on applications was subsequently appointed to pass on the applications for membership in the association. The committee consisted of Messrs. Yates, Bartholomew and Turner.

Reports of Delegates to National Conventions.

An example which might advantageously be followed in some of the other associations was furnished in the admirable reports made by the delegates to two meetings of the national association. Both of these reports were carefully prepared and presented in writing, and gave the members an excellent idea of the work of the national



L. L. BISHOP.



E. E. DEKLE.

body, thus comparing well with the extemporaneous and off-hand reports sometimes rendered to the state organizations. The late date at which the 1907 national meeting was held called for reports of two meetings instead of one, as would usually be the case. The Boston meeting was described by G. W. Woodruff in an interesting and suggestive manner, thus bringing up some subjects which were appropriate for consideration at the convention just held. The recent national meeting at St. Louis was covered by H. C. Briggs, who referred to the principal subjects considered, such as catalogue house competition, parcel post, Hardware exhibits, mutual Hardware insurance, and the arrangement of the dates of the various State associations so as not to conflict unnecessarily with one another. Both of the reports were thus of value, and contributed not a little to the interest and usefulness of the meeting.

Election of Officers.

On Tuesday evening at an executive session of the association the following nominations were reported by the Nominating Committee, and at the election then held the report was adopted and the nominees unanimously elected:

PRESIDENT, C. M. Tillman, McRae.
FIRST VICE-PRESIDENT, T. W. Brobston, Atlanta.
SECOND VICE-PRESIDENT, L. L. Bishop, Dalton.
SECRETARY-TREASURER, E. E. Dekle, Valdosta.
INSURANCE MANAGER, R. W. Hatcher, Milledgeville.
EXECUTIVE COMMITTEE: C. W. Tillman, McRae; E. E. Dekle, Valdosta; R. W. Hatcher, Milledgeville; Z. B. Hamilton, W. D. Bowers.

DELEGATES TO NATIONAL CONVENTION: E. E. Dekle, Valdosta; C. B. Thomas, Griffin.

Hardware Jobbers at the Convention.

The jobbers of St. Louis, Louisville and Chicago were strongly represented by leading members of the houses, or by gentlemen in close and constant touch with the merchants of the State, as follows:

NORVELL SHAPLEIGH HARDWARE COMPANY, St. Louis, Mo.: R. W. Shapleigh, J. C. Wimberly, H. M. Owsley, H. Cornelius, J. L. King, C. W. Collier, E. S. Allen.
HIBBARD, SPENCER, BARTLETT & CO., Chicago: H. D. Moore.
BELKNAP HARDWARE & MFG. COMPANY, Louisville, Ky.: Col. Morris B. Belknap, T. W. Brobston, T. W. Hereford, James J. Crawford.
SIMMONS HARDWARE COMPANY, St. Louis: R. F. Paddison, H. H. Jackson, John Welton.

Address of Judge George Hillyer.

An interesting address was made on Wednesday afternoon by Judge George Hillyer of the State Public Service Commission. The Judge referred in an instructive manner to the work of the Commission, especially as related to freight matters, touching upon such topics as the inspection of equipment, delays in transportation, the regulation of rates, freight and passenger, the preventing of rebates and unjust discrimination, and the adjustment of disputes. The impression made upon the convention was exceedingly favorable, and the members were strengthened in their confidence in the conservatism and wisdom of the Commission and its desire to be reasonable and helpful in the discharge of its great responsibilities. The principle which Judge Hillyer announced in his closing words, that a changeless purpose to do right is the best basis for success, individual and governmental, was evidently heartily approved by the convention.

Question Box.

The Question Box was an interesting feature of the gathering, but owing to the pressure of business it was not feasible to devote as much attention to it as might have been desired. A number of important subjects were, however, discussed and practical suggestions elicited. The subject of salesmanship was discussed by R. W. Hatcher, who made an interesting address, in which he alluded to some general principles and gave examples of correct methods. Mr. Hatcher said:

The essence of salesmanship is the ability to bring out points on the article offered for sale that will become favorably fixed in the mind of the purchaser, so that even though he should not purchase immediately, the impression made by the arguments of the salesman will linger with him and cause him to return and buy later. It matters not how commonplace the article shown may be, there are always points about them than can be emphasized and which will assist in making the sale. It is necessary to bring out the points and impress them with your best manner, and talk like you had conviction behind your words.

Selling a Cook Stove.

With an ordinary Cook Stove, for instance: Show the customer the system of flue circulation. Show him how it will bake the bread under the bottom and brown it on top, by reason of this correct circulation. Show him that it is made of pig iron. Take one of the lids, bring it down with force on the top of the Stove to show him the strength of the iron. There are many other points that could be emphasized, but these will serve to illustrate. Now, as a matter of fact, all well made Stoves have practically these same features, but the salesman who brings them out will make the sale.

Hardware offers a larger field for the development of salesmanship than any other business. It is one in the study of which you can grow enthusiastic, and the broadness of its sphere of investigation is as interesting as it is unlimited.

Method of Manufacture.

How many of you have ever studied the method of manufacture of the articles you sell? How many of you could take up the commonplace Manure Fork, as an example, and tell your customer just how the raw material is taken through the various processes of manufacture to the finished product which you are offering him? Likewise the ordinary Hand Saw, Hatchet or other edged tool. Don't you think your customer would go away better satisfied with his purchase if he had the story within his recollection? Don't you believe that he would think more of that tool and take better care of it, and over and above all, that he would go away feeling that you knew

your business and that you were the man for him to consult about any article in the Hardware line?

It behooves us to stir ourselves and begin to investigate and learn something about the vast scope of the Hardware business. You will be surprised at the attraction you will unearth. Talk to your clerks about it. Give them object lessons in the making of sales and in the description of articles.

Trustworthy Statements.

Another thing; impress upon your clerks the absolute necessity of trustworthy and reliable statements, or else the advantage of their arguments will be lost on your customer. Teach them not to let their remarks bear a suspicion of impertinence or a suggestion of superior wisdom that might injure the pride of your customer; but rather let them be of a suggestive nature, making the customer feel that he assists in reaching the conclusion.

Do not forget to cultivate a broad feeling of liberality that will enable you to warm toward your customer and to appreciate the fact, that he is favoring you with his patronage. Thus a mutual esteem will ripen into that good fellowship which makes all the world akin, and which will tend to your success and his betterment.

The Presiding Officers.

President Tillman, to whose wise and unwearied efforts the association is so greatly indebted, made an admirable presiding officer, holding the convention well in hand, and directing its deliberations happily and with dignity. At some of the sessions, on account of the president's indisposition, R. W. Hatcher, Milledgeville, was called to the chair, and his familiarity with the duties of the position were supplemented by his exceptional felicity as a speaker which gave to his introductions and remarks a peculiar grace and appropriateness.

Fire Insurance.

One of the most important questions before the convention was in regard to the organization of a State Hardware insurance company. This matter had been taken up at the last meeting, when a committee was appointed to consider the subject and report at the Indian Springs convention. This report was made on Wednesday evening by R. W. Hatcher, and as a result it was decided after a careful discussion to organize a State Hardware insurance company, and steps were taken to this end. It is evident that such an organization will have the hearty support of the members of the association, and it will doubtless be found an important means of furthering the growth of the organization. Mr. Hatcher will, it is believed make a wise and efficient manager.

Trade Harmony.

The tone of the convention was reasonable and conciliatory in regard to trade matters with a general recognition of the rights of jobbers and manufacturers. There was some incidental criticism of jobbing houses who sell to the retailers' customers, but it appears likely that the work of the association will tend to the correction of such practices.

Next Place of Meeting.

There was an animated canvass in regard to the place of the next meeting of the association, but at the last session on Wednesday evening Valdosta was unanimously chosen. The association is well represented in that city, and the merchants there united in a very hearty invitation. There is no doubt that the event will justify the wisdom of the selection, and that the characteristic hospitality of the city and the admirable arrangements which the merchants there will make for the convention, will do much to make the gathering enjoyable and in every way successful.

Resolutions.

Resolutions were adopted by the Association as follows:

1. That we urge our Georgia Legislature to pass a pure Paint law similar to the North Dakota law.
2. That we take up the question of the price of loaded Shells with the Shell Association and endeavor to secure a graduated price as to the quantity, 1000 being the minimum quantity.
3. That we urge the manufacturers of Steel Plow Shapes to increase their minimum quantity to 500 lb. instead of 300 lb.
4. That we appreciate to the fullest extent the efforts of the different exhibitors and trust that they will continue to favor us at future conventions.
5. That we extend our sincere thanks to Mr. Shapleigh of St. Louis, Mr. Belknap of Louisville, Mr. Williams of The Iron Age, Mr. Jones of Atlanta, and Mr. Corey of Argos, Ind., for the valuable and instructive services rendered us at this meeting.

6. That we express our appreciation of the visit of Mr. Barrett of the Retail Merchants' Association of Georgia and pledge to him our hearty support in the work of his association.

Amendments to the Constitution and By-Laws.

The following amendments to the constitution and by-laws recommended by the Committee appointed for that purpose, G. W. Woodruff, Chairman, were adopted: That merchants who handle wagons, buggies and farm implements be eligible to regular membership in the Association; that an insurance manager be elected to work under the supervision of the Executive Committee; that the secretary-treasurer of the association be elected by the Executive Committee and that he be reimbursed for his services at the end of each year to an amount to be determined by the Executive Committee; that annual dues of honorary members shall be \$2.50 instead of \$5; and that at the annual conventions of the association one or more open sessions be held each day for the discussion of topics of mutual interest and importance to both regular and honorary members.

Co-operation in Business.

R. W. Shapleigh of the Norvell-Shapleigh Hardware Company, delivered an address on "Co-Operation in Business," from which we make the following liberal extracts:

The idea of co-operation in business is very old; as far back as the seventeenth century it was in operation, and it has been adopted more and more extensively ever since in European countries. Indeed, to-day we find very strong organizations in Scotland and England doing an enormous business and paying large dividends. In

France, also, co-operative societies are very strong, particularly in building industries and agriculture. In Germany millions of people are connected with them; in that country they take more the form of the "People's Banks."

In Switzerland and Denmark they use this co-operative principle, and the dairy business in those countries is almost entirely operated in this manner. In Hungary the State takes a hand, and adds large subscriptions to the capital of co-operative societies. Austria also has over 5000 co-operative organizations. Millions of shareholders comprise these societies, and in this particular these aggregations of capital are very different from those large corporations that are owned and controlled by a few people.



R. W. SHAPLEIGH.

It would be interesting to go deeper into the operation of co-operation in the old country, but it is a very large subject. The fact that the principle of co-operation has been in use in various forms for so many years, and has been recognized as a legitimate and powerful factor in business is the point that I desire to establish.

Co-operative Societies Not Successful, as a Rule, in the United States.

In looking at the growth of co-operative societies in our own country, we find that they have not been successful as a rule, and this is probably accounted for by the vast difference in physical conditions; the enormous area of our country; the sparseness of population in contrast with European countries, the dissimilarity in the methods of conducting business and in the channels of trade.

A large number of Co-operative Societies have been started in the United States, but about the only ones that have found any ready support have been, what might be called "Farmers' Co-operative Societies"—organizations with a large list of shareholders, comprised of consumers in the territory, who have been led to invest their money with the promise that the organization would procure for them their machines, tools, etc., at the lowest wholesale prices, with freight added. These organizations, after a brief career, have with very few exceptions, gone to pieces.

This is properly the case, as such organizations only disturb and alter the regular and proper channel of trade; take from the enormous number of worthy retailers their trade and their profits. The retail merchants scattered all through this broad land, in the hundreds of thousands of larger or smaller rural settlements

are the strength and character of the communities in which they live, and in fact of the whole country. Any plan that tends to detract from their success and welfare is vicious, un-American and dangerous.

Channels of Trade.

There are, however, methods of co-operation in business that are proper, strengthening and uplifting, and should be constantly encouraged.

The recognized proper channel of trade is from the factory to the jobber, from the jobber to the retailer, and from the retailer to the consumer. The interest of the jobber and retailer are very closely interwoven. They are not antagonistic, but entirely mutual. The jobber is dependent upon the retailer and the retailer upon the jobber. Co-operation between the two then is natural, beneficial and reasonable.

Duty of the Jobbers.

Let us consider then how better co-operation can be brought about between them, and what should be the obligations of each. Speaking from the viewpoint of a hardware jobber, I believe it to be the duty of the jobber to co-operate with the retailer, and I believe that he can do it practically and effectively by observing the following points.

It is the first duty of the jobber to protect his customer in every way. The jobber should never sell to a consumer at all, except with the consent of a dealer that the consumer should select, having it clearly understood with the consumer that the dealer was to receive his proper profit.

To follow this rule is very easy. The most difficult matter to properly adjust and take care of is when a customer who, we will say for the sake of example, is in the stationery business, and is handling Fishing Tackle, sends in a mail order for Screen Doors to put on his own home. In a case of this kind, it is clearly the duty of the jobber to co-operate with his Hardware customer in that town by referring this gentleman in the stationery business to the Hardware dealer who keeps the Screen Doors for sale, and this is what is usually done, but it is done at the risk of making the stationery gentleman very angry and losing his trade on Fishing Tackle, which as you all know, is profitable business.

Protecting Customers.

Of course, the gentleman in the stationery business should have been willing to go to the Hardware dealer and buy his Screen Doors from him, but knowing that he is buying one line of goods from a jobber who also sells Screen Doors, he thought he was entitled to buy Screen Doors also from the jobber.

It is true that a large proportion of the business of some mail order houses is composed of articles bought for private consumption of an entirely different line from that which the merchant carries. For example, a dealer in the millinery business in a town having one of these mail order catalogues will buy a Lawn Mower for his own use and a man in the Hardware business in the same town will buy a trimmed hat for his wife.

This is one of the great evils of the mail order business, inasmuch as it gives any dealer an opportunity to buy, for his own consumption, goods away from home that are handled by his fellow merchant in his own town, and who should naturally have the benefit of his trade. Of course, the mail order houses make no distinction. Anybody who is a merchant can buy any item from them, no matter what line of business he may be in.

It is the duty of the jobber to co-operate with the dealer by giving his customers clean, fresh, up to date merchandise; by filling his orders promptly and complete, and by giving quick and fair settlement of all claims and errors. It is the duty of the jobber to help and co-operate with his customer by being progressive and up to date in putting in stock and providing his customers with new lines of attractive, salable and profitable goods; by advocating new and helpful ideas on the management of stock; methods of sale, and the general management of the business.

Varied Co-operation.

A practical method by which jobbers can co-operate with their customers is in educating customers and their clerks in regard to the merits and characteristics of different articles; giving them the talking points so that the articles may be more intelligently presented and more easily sold.

The jobber can also aid the retailer by instructing his own salesman to look closely after the wants of his customers by making helpful suggestions as to store arrangement, window dressing, &c.

The salesman for a jobber who has judgment and tact can be of much benefit to a dealer without being at all offensive or intrusive, and the dealer can well afford to listen to him, as the experience gained from constant visits to different dealers in the same territory, gives an intelligent salesman a fund of information that is very valuable to the dealer. The knowledge of the kind of

goods used, the new goods introduced in the territory, quantities to obtain, knowledge of the different retail prices prevailing in different parts of the territory, and in a word, any gossip and detail of what is being done by other merchants in different parts of the dealer's section is of great value, and the retailer who will ask such a salesman questions about all sorts of things and find out from him how certain people in that territory do certain things and endeavor to extract all the information possible, will be well repaid.

We know that this is true from our experience in the jobbing business. The knowledge gained from some salesman in whom we have confidence oftentimes proves of much value to us. Therefore, ask them about any item on which you may want advice. They will be delighted to help you. They understand that their interest and yours are identical, and that fact will urge them to give you the very best information that they have and the very best counsel that they can.

Another little item of practical co-operation is the matter of looking after the transportation of goods to the different sections. We have reduced the time of delivery of goods from St. Louis to Atlanta by means of package cars, wonderfully. From actual test, during the month of March, the average time of these package cars from St.

Promptness in Shipments. Louis to Atlanta was 38 hr., and at Atlanta they made connections with daily merchandise cars operating from all the lines diverging. It has been a general impression that the distance from St. Louis to Georgia and the Southeast made it hard to get goods from St. Louis, but you will see by this schedule that you can get them from there in much shorter time than you can from the East. All the railroads travel these cars, and all are giving excellent service.

The above are some of the details of the way a jobber can co-operate and help his customers, and, in general terms, it is not only the duty of the jobber, but his interest also to watch his customer's welfare in all things; to encourage State retail organizations; to co-operate with the National retail body; to observe all legislation hostile to retail interest and vigorously oppose such and strive by every means to bring the trade to a higher level.

Co-operation from the Retailer's Side.

You will now ask what is the attitude of the retailer to the jobber, and how can he do his part in co-operation between them. Well, the co-operation of the retailer with the jobber cannot, under the circumstances, be as active and direct as that of the jobber. Nevertheless by taking and putting into practice as fast as possible the improvements in goods and in methods; by evincing a willingness to encourage and appreciate good service and by commending and advertising any good thing promulgated by the jobber, he can encourage and support and co-operate practically with the jobber's efforts.

Value of Associations.

Really the most practical thing to a retailer, if he desires to improve his methods and business generally, is to join the State retail organization and attend the meetings. No dealer can come in contact with such a representative body of retail merchants as are here assembled and discuss with them the different methods and ways of improvements of handling the various problems that confront all alike, without learning something that will prove of much benefit, and they will be repaid many fold for the expense and time necessary to attend the meeting. In a multitude of course there is wisdom.

This is the practical and definite advantage, but who can measure the advantage and benefits gained by coming in close personal contact and making the friendship of your fellow-dealers all over the State? The effect of these organizations in this particular, seems to me, to be plainly seen in the more courteous attitude of competitors in the Hardware business toward each other. The old vicious rule or ruin methods of competition are fast disappearing. It is a rare thing now to find a town where competitors in the Hardware business are not on friendly footing, and on account of this co-operation between themselves, all are successful.

The State retail organizations are directly responsible for this improved condition. In no other way can merchants in the same line of business in different parts of the State become acquainted and learn the good points of each other's methods, and thus adopt the best from the experience of all.

Volumes could be written on the advantages of joining State organizations. Their growth and their influence to-day are all the recommendation they need. State organizations should follow out the principle of co-operation by acting in thorough harmony and accord with the national body.

Substantial Results of United Action.

It is very evident to me that had it not been for the National Retail Hardware Association's vigorous cam-

paign in regard to Parcel Post, and the splendid courageous co-operation given the national association on this subject by the State associations, that we would have had on our statute books to-day a bill of some character that would act as an entering wedge in this matter.

If it had not been for the united action of the Hardware trade of the country through their State associations and national associations, acting through the joint committee of retailers and wholesalers on the catalogue house question, the evils of this method of doing business would be double what they are to-day. When this struggle against them had first begun, they were marching on triumphantly, arrogantly and invincibly. To-day they are halted, baffled, undecided, and wavering.

Colonel Belknap's Address.

After a few words of congratulation to the members upon the substantial commercial lines along which the Hardware business in Georgia is established, due largely to the high character and personnel of the merchants, Col. Belknap called attention to the fact that as high an authority as President Eliot, of Harvard now ranked business as a science. Continuing, he said:

The co-ordination of the five departments of a business establishment, viz.: the buying, selling, transporting, accounting and adjusting, requires a systematic treatment. Each must be accorded the importance it deserves, and none deserves to be slighted.

How Little We Know About Money.

Associated with the accounting department is primarily the subject of money. It is very strange, when we think how eagerly we seek to make money, how little we know about it when it is attained. We are up early in the morning, each hour of the day finds us busy with the complicated problem how to make money. According to the figures on our books we have made some, but whether in the shape of accounts debited customers, or actual cash in the drawer, we still realize that this money we have made is much of a mystery to us. If among our cash items we find one or two checks, we realize that now they look very much like money, whereas six months ago they were mere orders which banks seemed



MORRIS B. BELKNAP.

to pay or repudiate at will. That panic was a severe storm, but, fortunately, while the wind played havoc with much of our property we were spared the usual concomitant of a drenching rain. And so we congratulate ourselves that we got off rather well, and perhaps the next storm is a long ways off.

We are not just to ourselves when we fail to get nearer to the real problem of the money question. It is not one solely for the banker. Because he is the custodian of what we make, does not constitute him the authority of the true value of the money we deposit with him. "We want what we want when we want it," we can say of our funds in bank, as well as the gouty old Frenchman with whom the saying originated exclaimed of his prerogatives. But we well know that a recurrence of conditions such as we had last fall would likewise mean, as then, a disappearance of cash and a reappearance of certificates.

Greater Elasticity in Currency Desirable.

I do not come to you as the apostle of any one of the financial measures now before Congress. The one which appeals to me strongest is that which will give us greater elasticity to prevent the hoarding which embarrassed us last fall, and at the same time will be as conservative as possible. But our own duty lies in a personal interest in the selection of Senators and Representatives, who will have the intelligence to grapple with this great question. As already stated, money is the thing we are after, and the best we can get is none too good. So in determining its essential features let us give some attention to the class of men we send to Congress to enact the important laws that will give us a currency worthy of our vast business interests.

CONVENTION NOTES.

E. C. Atkins & Co., had a very complete and attractive display and their representatives, A. M. Sinclair, T. L.

Hoshall and V. A. Lane, were unremitting in their attention to the members.

The American Steel & Wire Company was efficiently represented by L. A. Dietrich of New York, C. J. McCue, E. A. Nevin and M. H. Conolly. Mr. Dietrich, who has a host of friends in the association and the state at large, was called upon near the close of the Wednesday morning session and made an interesting address.

Prominent among other manufacturers was the Union Metallic Cartridge Company, whose representatives extended many courtesies to the members and guests.

The line of Paints and allied interests which is taking so conspicuous a place in the Hardware trade, was represented by the Patton Paint Company, the F. W. Devoe & C. T. Reynolds Co., and the Pittsburgh Plate Glass Company.

Souvenirs were not greatly in evidence, but some pleasant reminders of the gathering were given out by the Norvell-Shapleigh Hardware Company, F. W. Devoe & C. T. Reynolds Company, and Patton Paint Company.

A pamphlet was distributed at the convention containing the minutes, resolutions, &c., of the last annual meeting held at Tipton. It also presented the constitution and by-laws adopted by the association, names of officers and list of members at the time the pamphlet was printed.

"Plymouth Products."

THE PLYMOUTH CORDAGE COMPANY, North Plymouth, Mass., is distributing a booklet which is described as the first of a series of monthly bulletins giving information concerning the company and its products. The booklet is handsomely and profusely illustrated, containing many views of historical features and characters associated with the town of Plymouth. A sketch of the company's history is given, with a striking comparison of the facilities and output of early years with those of the present day. There is also an article showing the economy of buying high grade Cordage as compared with cheaper varieties. In future numbers of this organ it is designed to include miscellaneous information concerning Cordage matters which will be of general interest, and altogether "Plymouth Products" promises to furnish something of value to every buyer of Rope.

Trade Items.

AMONG the attractive pieces of advertising matter recently issued by Yale & Towne Mfg. Company, 9 Murray street, New York, are booklets entitled "Light on Latches," and "On Getting Yours and a Little More." The former treats of Rim Night Latches; the latter cleverly suggests methods by which merchants may stimulate their Builders' Hardware business, illustrating in this connection electrotypes which the company furnishes gratis to the trade.

HARMON & DIXON, 117 Chambers street, New York, who are sales agents for a number of prominent Hardware manufacturers, have taken on the account of the National Duster Company, Philadelphia, manufacturer of Feather Dusters. The firm will have a full line of samples on display in their show room, and will carry a complete stock.

SAMUEL DISSTON, for many years general manager of Henry Disston & Sons, Inc., Philadelphia, Pa., is about to retire from active service in connection with that company. The employees of the corporation will tender Mr. Disston a complimentary dinner at the Bellevue-Stratford Hotel, on Thursday, 28th inst.

E. S. PEASE, who makes a feature of marketing high class novelties and goods of souvenir character for distribution by manufacturers and merchants, recently moved from Temple Court to the new Hudson Terminal Building at Fulton and Church streets, New York City.

FRENCH & LINFORTH, who have been occupying temporary quarters in Oakland, Cal., have removed to a permanent office in Wells, Fargo & Co.'s building, corner of Second and Mission streets, San Francisco.

AMONG THE HARDWARE TRADE.

M. Weinstein, who handles Shelf Hardware, Cutlery, House Furnishing Goods, &c., has removed from 415 Grand street to 291-293 Bowery, New York, where he will occupy store, basement and subcellar.

Galer & Musser have bought the Hardware, Paint, Mine Supply, Tinning and Plumbing business of James E. Johnston, Barnesboro, Pa.

The Lindsey-Tolson Hardware Company, successor to Lindsey Hardware & Implement Company, Hollis, Okla., has been incorporated with a capital stock of \$10,000 and \$6500 surplus. A \$35,000 retail stock of Shelf and Heavy Hardware, Stoves, Tinware, Agricultural Implements and Sporting Goods is carried.

The stock of C. A. Robinson, Strong City, Kan., was recently damaged by fire to the extent of \$250. The lines handled include Shelf and Heavy Hardware, Agricultural Implements, Paints, Oils, Sporting and Athletic Goods.

The business of G. W. Hoover in Audubon, Iowa, including Hardware, Furniture and Farm Implements, has been partially disposed of to Christensen & Lang of the same town. G. W. Hoover retains the Furniture and Undertaking departments.

Joseph H. Gilmore, Jefferson, N. Y., has sold his stock of Hardware and Implements to Hubbard Bros., who will continue the business at the old stand.

The R. H. Shield Hardware Company is a new concern in Tacoma, Wash., doing a retail business in Shelf and Heavy Hardware, Stoves, Tinware, Agricultural Implements, Paints and Sporting Goods.

Hickman Hardware Company, Hickman, Ky., recently suffered loss by fire of \$3200. The company handles Shelf and Heavy Hardware, Stoves, Tinware, Agricultural Implements and Sporting Goods.

Rogers Hardware Company, Rogers, Ark., has incorporated with an authorized capital of \$100,000 to do a wholesale and retail business in general Hardware, Harness, Implements, Vehicles, Furniture, &c.

The Jacksonville Hardware Company has been incorporated in Jacksonville, Fla., with a capital stock of \$10,000. The company handles Shelf Hardware, Stoves, Tinware, Paints, Oils, Sporting and Athletic Goods, doing both a wholesale and retail business.

Requests for Catalogues, Etc.

The trade is given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

REQUESTS for catalogues, price-lists, quotations, &c., have been received from the following houses, with whom manufacturers may desire to communicate:

FROM J. H. WHITNEY, Merrill, Mich., ex-president of the Michigan Retail Hardware Association, whose store and stock have been totally destroyed by fire. Mr. Whitney is doing business in a rented building and will at once erect a new store.

FROM MEYER & STEINKAMP, Holland, Ind., successors to the Hardware, Paint, Sporting Goods and Furniture business of Christ Roettger.

FROM J. T. BOYLAN, who has just opened a Hardware, Stove, Mill Supply and Sporting Goods store in Boyne City, Mich.

FROM WILLARD BROS. & HOLT, Chattanooga, Tenn., who have recently added a Hardware department to their builders' and contractors' supply business.

FROM ERNEST HARDWARE & PLUMBING COMPANY, Seattle, Wash., which has been incorporated with a cap-

ital stock of \$100,000, to conduct a wholesale and retail business in Shelf and Heavy Hardware, Stoves, Tinware, Paints, Sporting Goods and Plumbing and Heating Supplies.

FROM CO-OPERATIVE SUPPLY COMPANY, Dallas, Texas, which will put in a line of Household Hardware and Novelties.

Price-Lists, Circulars, Etc.

Manufacturers in Hardware and related lines are requested to send us copies of catalogues, price-lists, &c., for our Catalogue Department in New York; and at the same time to call attention to any new goods or additions to their lines, of which appropriate mention will be made, besides the brief reference to the catalogue or price-list in this column.

WINCHESTER REPEATING ARMS COMPANY, New Haven, Conn.: Revised schedule of list and selling prices of Winchester Rifles and Shotguns in effect May 1, 1908.

O. C. WHITE COMPANY, Worcester, Mass.: Illustrated catalogue covering an extensive line of Adjustable Fixtures for Incandescent Lamps.

CHICAGO MODEL WORKS, William Trautman, proprietor, 179-181 East Madison street, Chicago, Ill., illustrated 20-page catalogue of small machinery, patent office, law court and working models, suitable for inventors and others.

THEO. J. ELY MFG. COMPANY, Girard, Pa.: Illustrated catalogue for 1908 referring to Mop Heads and Wringers, Towel Racks, Carpet Beaters, Handles, &c.

EVAN L. REED MFG. CO., Sterling, Ohio: Illustrated catalogue No. 2-B, referring to Hardware and Woodenware specialties.

I-XL FURNITURE COMPANY, Goshen, Ind.: Illustrated catalogues covering an extensive line of Kitchen Cabinets, Cupboards, Tables, Sinks, &c., and other furniture.

BRUNER STEEL WAGON COMPANY, Wapakoneta, Ohio: Illustrated catalogue No. 9, referring to Wagons, Trucks, Doubletrees, Singletrees, Neckyokes, &c.

BRAINERD MFG. COMPANY, East Rochester, N. Y.: Supplement No. 2 to 1907 catalogue, illustrating and listing numerous additions to its line of Hinges, &c.

HOBART ELECTRIC MFG. COMPANY, Troy, Ohio: Illustrated bulletin No. 605, referring to Standard Electric Coffee Mills and Meat Choppers.

TOPPING BROTHERS, 122 Chambers street, New York: Attractive illustrated catalogue, referring to Burrows Ball Bearing Jacks, Lightning Tool Grinders, Lightning Track Drills and Totten Brake Beam Clamps. The booklet contains much information of value to users of this class of goods.

ANDERSON TOOL COMPANY, Anderson, Ind.: Elaborate catalogue, illustrated in colors, referring to Anderson Automatic Computing Scales, and giving schedule of equipment, capacity, &c.

KELLEY-HOW-THOMSON COMPANY, Duluth, Minn.: Illustrated catalogue No. 50 with accompanying net price list, referring to spring and summer Sporting Goods, &c.

Cross Cut and Flexible Egg Whips.

Among the goods recently put on the market by the Wire Goods Company, Worcester, Mass., are the egg

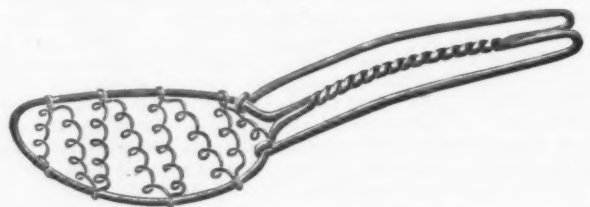


Fig. 1.—Cross Cut Egg Whip No. 343.

whips shown in the accompanying illustrations. A feature of the whip No. 343, shown in Fig. 1, is the cross

cut spiral wires which are alluded to as doing rapid work on account of the large number of cutting edges. The whip measures 10½ in. over all. The No. 390 whip, Fig. 2,

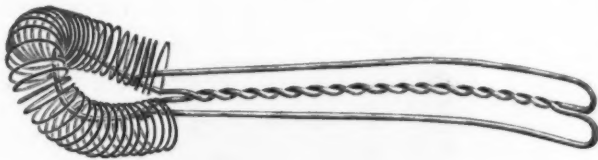


Fig. 2.—Flexible Egg Whip No. 390.

is 9½ in. over all, and has a continuous frame to give support to the coiled spring. Both of the whips are retinned.

Commode Slop Pail and Flue Thimble.

Two specialties made by the Weber-Kirch Mfg. Company, Keokuk, Iowa, are shown in the accompanying illustrations. Fig. 1 represents a flue thimble, which combines several features of improvement; the first of these being its adjustability, which adapts it for use in either a 6 in. or 7 in. flue hole, thus relieving the merchant of the necessity of carrying two sizes. The adjustment is quickly and easily made without the aid of tools. Another feature to which attention is directed is the deep ridge pressed in the circumference of the thimble, the function of which is to prevent the pipe being pushed too far into the flue; it likewise serves to hold the pipe from pulling out of the flue, and makes a practically airtight joint around the pipe, preventing water, soot or smoke from entering the room. The flue thimbles are made of common black and galvanized steel and are furnished unadjustable in a 6 in. size only, if desired. They are represented as being no more expensive than the common thimble, are packed closely nested together one dozen in a roll, three gross in a bar-



Fig. 1.—Kirch's Adjustable Flue Thimble.



Fig. 2.—Kirch's Sanitary Combination Commode Chamber Pail.

rel, and weigh about 70 lb. per gross. Fig. 2 illustrates a sanitary combination commode slop pail. It is provided with a roll rim seat, which is fastened to and made part of the pail, and is furnished with a suitable lip for emptying the contents. The lid fits down into the groove between the seat and outer rim, which when filled with water forms an airtight trap, as ¾ in. of water is held in the groove, and suitable provision is made to drain any overflow to the inside of the pail. The advantages of this device and its serviceability as a household convenience are obvious. It is made only in 12 quart size, either of galvanized iron, striped and varnished, or of XXX extra quality charcoal tin, enameled in red and blue with gold stripes, and packed one-third dozen in a crate.

Seacombe Head Protector.

Charles M. Seacombe, 72 East Eighty-second street, New York, is the manufacturer of the Seacombe head protector, two views of which are here given. The protector is made in three models, suitable for the ordinary Derby or soft hat, and for policemen's and firemen's helmets, in three sizes of each of the three models to fit 6¼ to 7½ in. regularly, and in other sizes to order. Fig. 1 shows model 1 for Derby and similar hats. Model 2 is similar in construction, but adaptable particularly to the helmets worn by policemen, while the third shape resembles model 2, but as an additional protection against falling glass and other substances is covered with a steel

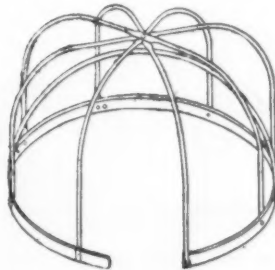


Fig. 1.—Seacombe Head Protector.

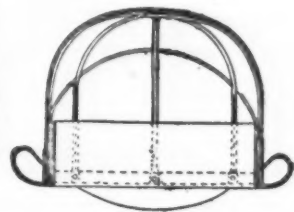


Fig. 2.—Protector Inserted in Derby Hat.

wire gauge, having a ¼-in. mesh. These head protectors are offered as capable of resisting a crushing weight from a falling object equivalent to 248 lb. The material of which the protector is made is thin, highly tempered spring steel, baked japan finish. While the cage-like construction affords protection to the head of the wearer from falling objects, such as planks, bricks, bolts, rivets, nuts, &c., it can be inserted in an instant, weighs but ¾ oz., and its presence outwardly is not apparent. It also serves as a shock absorber in the event of blows from a black jack, lead pipe, sand bag or club wielded by a thug. While designed for universal use, the protector is especially serviceable for workmen and others whose daily avocations subject them to frequent risks of the character alluded to.

Lipscomb Disk Screw Calks.

The accompanying illustrations represent the goods produced by the Lipscomb Disk Screw Calk Company, 106 Park street, New Haven, Conn. The calks are made in several sizes, for the use of river drivers, timber men, hunters, ice cutters, cricket and golf players, as well as for ice creeping and mountain climbing. The feature of the calks is the concavity of the disk, as illustrated, which is designed to receive the bulging of the leather when the calk is screwed into the boot sole; also allowing the edge of the disk to rest squarely on the leather. It is explained that the concave disk prevents the calk bending and working loose in wet or inferior leather, or breaking

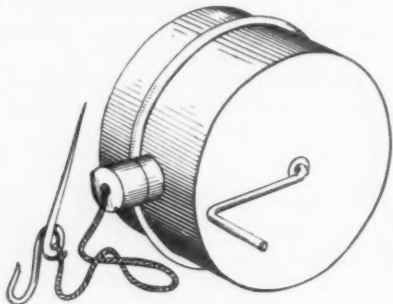


Lipscomb Disk Screw Calks.

off just above the disk, as the result of lateral strain. The calks are inserted and removed quickly by means of a small brace wrench, or bit chuck, furnished with the calks. The company states that the calks will not pull out or work into the foot, and that they will stand a severe glancing blow or kick without breaking. They are put up in small pasteboard boxes and cartons, bearing the trademark shown in the illustration.

Eastman's Always Ready Chalk Line.

The Eastman Mfg. Company, 410 Riverside, Spokane, Wash., is offering the chalk line, herewith shown, for the use of painters, paper hangers, decorators, carpenters, sign writers, decorative plasterers, &c. In use the metal case is filled with powdered chalk, any color desired. When the line is reeled up the line is held within the reel, out of the way of moisture, and free from danger of being



Eastman's Always Ready Chalk Line.

cut or tangled, and can be carried in a tool chest, tool bag or pocket without inconvenience. The awl which is attached to the line is held to the case, when unemployed, by a hollow shaft, and is therefore always ready for use. The sharpened hook at one end of the awl is designed for sign writers or others wishing to work on cloth. The company states that the device is not a complicated piece of machinery and cannot possibly get out of order; also that one should last indefinitely, as it is made of the best material.

Top Notch Sash Pulleys.

The American Pulley Company, Philadelphia, Pa., has added to its line the Top Notch sash pulleys shown in the accompanying illustrations. The wheel is made of three pieces, with the two sides electrically welded to-

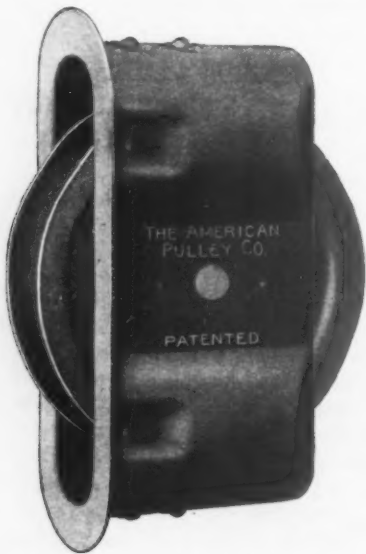


Fig. 1—Top Notch Sash Pulley No. 3.

gether, making, it is said, a wheel that will not pull apart with a weight of 150 lb. on one wheel. The bushing is made of 0.042 in. steel and is 31-64 in. long and locked in the wheel. The groove is suitable for cord or chain. The axle pin is shouldered so that the metal of the housing is locked between the shoulder of the pin and the riveted end. The face plate is made with turned in flanges, to which the sides of the housing are electrically welded. The housing is entirely new in design, consisting of two pieces, which, instead of butting opposite the groove of the wheel, lap opposite the center of the wheel, so that the axle pin at each end has the support of two thicknesses of metal. The two pieces of housing

are electrically welded to the turned in flanges of the face plate. The holding spuds are integral with the rounded ends of the housing, being cut in the arch so that when set up they hold. Each spud is supplied with



Fig. 2.—Top Notch Sash Pulley No. 4.

a recess to locate the end of the tool used for setting up. Two styles are made, No. 3, Fig. 1, with face plate 2 15-16 x 1 in., and over all length of housing, 2 1/2 in. It fits mortises made by triple gang bits. No. 4, Fig. 2, has the same size face plate, with length of housing 2 11-16 in. It fits mortises made by quadruple gang bits. The pulleys are recommended as labor saving, strong, of good design and easy of application. They are protected from rust.

National Safety Gas Cock.

The National Safety Gas Cock Company, 1061 Lexington avenue, New York, has brought out the National safety gas cock here illustrated. The purpose of this device is to prevent asphyxiation through the unintentional or accidental turning from any cause whatever of the gas cock key. As shown, there is a positive stop caused by the thumb lever fitting snugly into a groove or slot cut in the body of the burner, the lever being kept in position by a phosphor bronze spiral spring, which will withstand the action of acid in dipping, and, it is said,

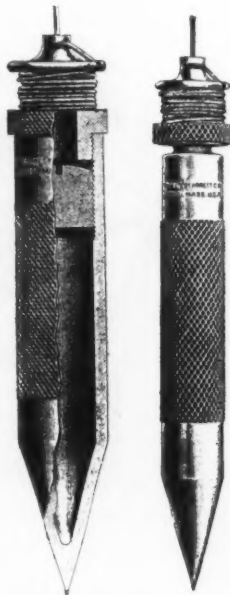


National Safety Gas Cock with Thumb Lever.

last as long as the cock itself. The key turns but one way instead of either way or all around. This method of construction renders necessary deliberate intention to turn on gas, thus preventing accidental carelessness caused by an open key. The click of the finger lever determines when the key is properly seated, locking body and rotary plug together.

Improved Mercury Plumb Bob.

The L. S. Starrett Company, Athol, Mass., and 132 Liberty street, New York, is marketing its improved mercury plumb bob, No. 87, here illustrated as in use and sectionally. The principal improvement is a patented device for carrying and fastening the string without a knot to tie or untie, by merely drawing the cord into the peculiarly slotted neck at the top, after unwinding the necessary length, when the bob will hang perfectly true. The plumb bobs are made from solid steel, bored and filled with mercury, there being a tight fitting screw cap inside to keep the mercury intact. Leading characteristics of this construction are the great weight in proportion to size, low center of gravity, small diameter, hardened and ground points, knurling on the body and the simple yet effective device at top for fastening end of line after winding up the cord, so that the latter is always conveniently at hand, but not in the way. Regularly each bob has 8 ft. of a specially imported braided silk line and the goods are polished and nickel plated. The No. 87 style, mercury filled, is made in 4, 5, 5½ and 6 in. lengths, with diameters of ½, ¾, 1 and 1½ in., weighing respectively 3½, 6, 12 and 16 ounces. Another plumb bob, similar in appearance, No. 177, is made from solid steel and of the same outer dimensions, but weighing 2¾, 5, 8½ and 14½ ounces respectively.



Plumb Bobs, Mercury Filled and Solid.

Ornamental Fireproof Door.

The Kinnear & Gager Mfg. Company, Columbus, Ohio, W. H. Brodie Company, 45 Vesey street, New York agent,

is putting on the market the ornamental paneled fireproof door and trim here illustrated. The frame or core of the door is substantially built of wood, and is covered with kalamein or charcoal

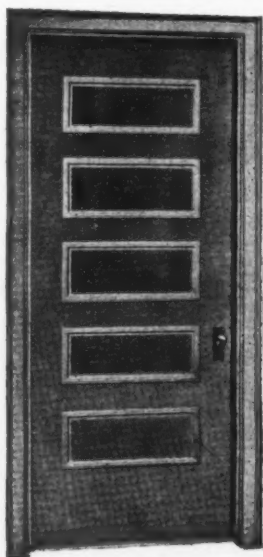


Fig. 1.—Fireproof Door.

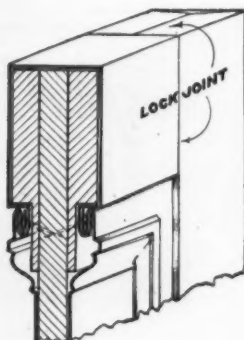


Fig. 2.—Cross Section of Door.

iron. The metal is applied by a patented process of construction, with double lock seams and joints, so that no nail heads or open joints are visible. The process may be understood by referring to Fig. 2, showing how the edges of the metal sheets are interlocked around the panel, after which they are hammered together, forming a solid joint composed of four thicknesses of metal. The doors are susceptible of high finish or any style of graining. They are made in 169 standard sizes, from 2 x 6 to

4 x 8 in even inches, width and height, but not in fractional parts of inches. Sash doors and trims are made in the same method of construction.

Lightning Portable Hand Punch and Shears.

The American Lock Nut Company, Oregon, Ill., New York branch, Charles Longenecker & Co., 150 Nassau street, is offering a line of portable hand punches and shears of the general type shown in the accompanying illustrations. The tools are designed for general service in punching holes in angles, flanges, tank heads, ferrules.



Fig. 1.—Lightning Portable Hand Punch No. 7.

2 in. in diameter and larger, and other miscellaneous uses where hand work is required. They are also referred to as being especially serviceable for punching holes in close corners and intricate places where it is difficult to reach with ordinary tools. As ordinarily constructed, holes to the center of a 1-in. flange or angle can be punched, and when so ordered the tool can be arranged to punch the center of a ¾ or 1 in. angle. Fig. 1 illustrates the No. 7 punch, which is provided with a compound lever and punches only with the down motion of the lever, and differs in this respect from the regular construction which is designed to punch and strip with either the upward or downward movement of the lever. The punch takes punches and dies up to ½ in., and is provided with a

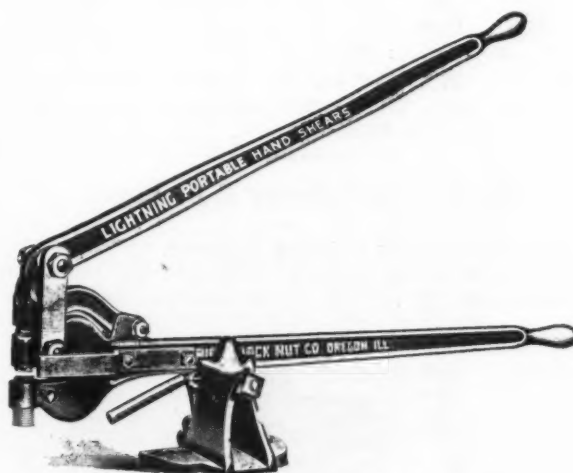


Fig. 2.—Lightning Portable Hand Shears.

power lever 30 in. long. Fig. 2 shows the Lightning portable hand shears, which is of the same general construction as the punches, having shear blades inserted in place of punches. This tool can be used for cutting bands, either round or flat, and has a capacity up to 4 x 3-16 in. bar. A convenient quick acting vise is furnished for holding these tools for stationary work. When used in this way in connection with gauges, which can be easily fitted to the tool, accurate and satisfactory work can be done. The vise is operated by a cam and lever, so that the punch can be instantly fastened or released. The weight of the punch shown in Fig. 1 is 17 lb., and the vises weigh 12 lb. each.

The Carolus Nut Splitter and Bolt Clipper.

A tool designed for general utility service in mechanical work is the nut splitter and bolt clipper made by the Carolus Mfg. Company, Sterling, Ill., and here illustrated. The convenience of such a tool in shop, factory, farm or other work necessitating the cutting of bolts or removal of nuts is readily recognized, and the combination of required mechanical facilities in one instrument was the specific object aimed at in the design of this tool. The tool is provided with three distinct cutting edges, two of



The Carolus Nut Splitter and Bolt Clipper.

which are set at right angles with the handles, the other being parallel therewith. It is thus made possible to cut bolts at different angles, and it is claimed that it makes a clean cut, leaving threads in such condition that the nuts can be easily removed or replaced. In construction the tool is exceedingly simple and, though light and easily handled, it is designed to stand the hard usage of miscellaneous service. The cutting blades are of high grade tool steel, and are set in a frame composed of drop forged spring steel plates; the pivot screws are also of tool steel. The nut splitter and bolt clipper is made in two sizes, Nos. 1 and 3, the former cutting up to $\frac{3}{8}$ -in. bolts, and the latter up to $\frac{1}{2}$ -in. bolts.

Rural Free Delivery Mail Boxes.

The Northwestern Mail Box Company, St. Louis, Mo., is offering a line of rural free delivery mail boxes, two of which are represented in the accompanying illustrations.

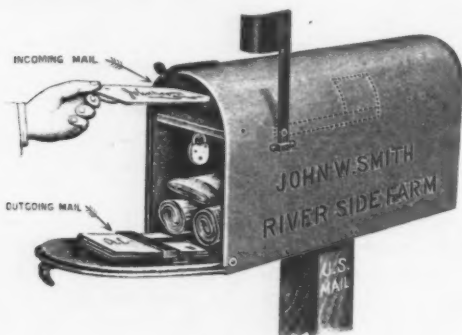


Fig. 1.—Carrier's Friend Mail Box No. 1.

The box illustrated in Fig. 1 contains an upper compartment for incoming mail which offers privacy and security to the patron, in that his first class mail is always under lock for which he only has a key. The first class mail being locked in the upper compartment, makes the use of a padlock on the door unnecessary, thus relieving the carrier of the necessity of carrying a master key.

There is a receptacle on the inside of the door for outgoing mail which enables the carrier to collect it quickly without removing his gloves. A positive locking flag signal painted red is attached to the side of the box, and is so shaped that it can be seen from any angle in



Fig. 2.—Carrier's Friend Mail Box No. 2.

the road. The door is equipped with a strong positive spring latch which cannot be broken open. The size of this box is 19 by 10 by 6 in. Carrier's Friend No. 2, shown in Fig. 2, has one large roomy compartment. A letter slot in the door enables the carrier to insert the mail with one hand and so saves the time of opening the box. The slot is protected with a flap fitting closely to the box, which is equipped with the same catch and flag signal as the No. 1. The size of the No. 2 box is 19 by 8 by 6 in. Fig. No. 3 illustrates the manner in which

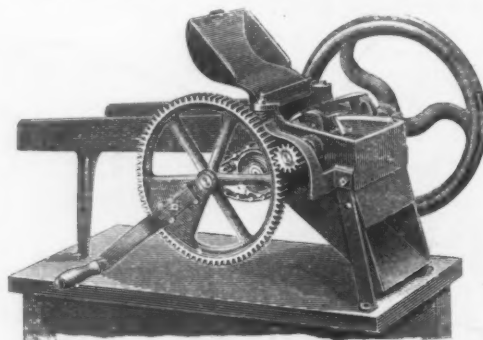


Fig. 3.—Manner in Which End Pieces Are Fastened to Body.

the end pieces are fastened to the body. It will be observed that it is rolled in such a way as to make it absolutely weather-proof. The boxes are made of galvanized steel finished in aluminum and have been approved by the Postmaster-General. Each box is wrapped in white paper and one-half dozen are packed in a crate, the weight per crate being about 50 lb. The patron's name, if desired, will be stenciled on the box, and the stencil enclosed therein for his future use.

New Model Clover Cutter.

The Silver Mfg. Company, Salem, Ohio, is putting on the market the Clover cutter for poultry, which is shown herewith. It is designed for cutting into $\frac{1}{8}$ in. lengths, either green or dry clover, alfalfa, vegetable tops, &c., which are referred to as both cheap and productive egg



New Model Clover Cutter.

forming poultry foods for cold weather. The machine is 28½ in. long over all and weighs 60 lb., being intended for mounting on a box or bench at any height to suit the operator. It is made of iron and steel only, has large capacity, and is said to run easily, feed strongly and do good work indefinitely. The feature of the machine is its cutting mechanism, which is patterned after the Ohio cutters made by the company. This can be kept in perfect order because the cutter bar is adjustable and easily accessible and the four 7-in. spiral steel knives can readily be removed for sharpening.

Hendryx Complete Picture Hanger.

The Andrew B. Hendryx Company, New Haven, Conn., is putting on the market the complete picture hanger illustrated herewith. Each hanger is put up in a separate envelope containing what is necessary to hang one picture, namely, two 1-yd. lengths of wire picture cord, each



Hendryx Complete Picture Hanger.

securely fastened to a hook made of strong brass tubing, and two screw eyes for attachment to the frame of the picture. The advantages claimed for the outfit are that it is compact and convenient for buyer and seller and also that the small hooks, while strong and durable are almost invisible on the molding.

Hadaway Electric Glue Pot.

The Westinghouse Electric & Mfg. Company, Pittsburgh, is marketing a variety of electrically heated Glue Pots, made by Hadaway Electrical & Engineering Company, to meet the requirements of different lines of work, one of which is shown in the accompanying illustration. They are provided with a patent water circulating device consisting of a hollow ring of copper carrying at its lower end a diaphragm of copper, which has a small hole at its center. This device is fitted inside the water bath in such a manner that a thin film of water is exposed to the full effect of the heating element and a rapid circulation is set up which results in the water being quickly raised to the proper working temperature. A cut off is provided which reduces the current so that just enough is used to keep the glue at a fixed temperature. A brass wiper is fitted to the glue pot and secured in position by rivets and soldering. The bail is of brass and is attached to the pot by brass ears secured by soldering and rivets. The glue

pot is spun from heavy sheet copper and the water bath is a seamless copper vessel. The heating element surrounds the bottom portion of the water bath and is pro-



Hadaway Electric Glue Pot.

tected by a waterproof tin jacket. Portable and bench glue pots are also made in various sizes.

Nettleton Reversible Cutting Nipper.



Nettleton Reversible Cutting Nippers.

The Starr-Nettleton Company, East Hampton, Conn., has brought out the new reversible cutting nipper shown in the illustration. Each of the jaws has two fine cutting edges, and held in place by two screws, being consequently easily reversible, adjustable and interchangeable, and at the same time strongly constructed. The nipper is made in five sizes, 6, 8, 10, 12 and 14 in., for 1-16, 1/8, 3-16, 1/4 and 5-16 wire.

E. J. Binder and Phillip Clotz have opened a Hardware store at Lorain, Ohio, under the firm name of Clotz & Binder.

PAINTS, OILS AND COLORS

Animal, Fish and Vegetable Oils—

Animal, Fish and Vegetable Oils—	per gal.
Linseed, State and Western, raw	.42 @ .44
City, Boiled	.45 @ .46
City, Raw	.44 @ .45
Raw, Calcutta, in bbls.	.70 @ .
Lard, Prime, Winter	.67 @ .70
Extra No. 1	.55 @ .57
No. 1	.47 @ .52
Cotton-seed, Crude, f.o.b. mill	.40 @ .
Summer Yellow, prime	.48 @ .48 1/2
Summer White	.49 @ .50
Yellow Winter	.49 @ .50
Tallow, Acidless	.52 @ .55
Menhaden, Brown, Strained	.40 @ .
Light Strained	.40 @ .
Bleached Winter	.42 @ .
Ex. Bleached Winter	.44 @ .
Cocanut, Ceylon	.7 @ .7 1/2
Cochin	.7 @ .7 1/2
Cod, Domestic, Prime	.42 @ .44
Newfoundland	.44 @ .46
Red, Elaine	.37 1/2 @ .39
Saponified	.7 @ .7 1/2
Olive, Yellow	.6 @ .6 1/2
Neatsfoot, Prime	.55 @ .58
Palm, Lagos	.7 @ .7 1/2

Mineral Oils—

Mineral Oils—	per gal.
Black, 29 gravity, 25@30 cold test	.13 @ .13 1/2
29 gravity, 15 cold test	.13 1/2 @ .14
Summer	.12 1/2 @ .13
Cylinder, light filtered	.20 1/2 @ .21
Dark, filtered	.18 @ .19
Paraffine, 903-907 sp. gravity	.14 1/2 @ .15
903 sp. gravity	.13 1/2 @ .14
903 sp. gravity	.11 @ .11 1/2
Red	.13 1/2 @ .14

Miscellaneous—

Miscellaneous—	per ton
Borates:	
White, Foreign	\$9.50 @ \$20.50
Amer. floated	\$8.00 @ \$20.00
Off color	\$13.00 @ \$16.50

Chalk, in bulk	per ton 3.00 @ 3.40
China Clay, Imported	per ton 11.50 @ 18.00
Cobalt, Oxide	per 100 lb 1.45 @ 2.60
Whiting, Commercial	per 100 lb .42 @ .52
Gilders	per 100 lb .55 @ .60
Ex. Gilders	per 100 lb .60 @ .65

Putty, Commercial—

Putty, Commercial—	per 100 lb
In bladders	\$1.70 @ 1.80
In bbls. or tubs	1.20 @ 1.45
In 1 lb to 5 lb cans	2.65 @ 2.95
In 12 1/2 to 50 lb cans	1.50 @ 1.90

Spirits Turpentine—

Spirits Turpentine—	per gal.
In Oil bbls.	.45 1/2 @ .46
In machine bbls.	.46 @ .46 1/2

Glue—

Glue—	per lb
Cabinet	.12 @ .15
Common Bone	.7 1/2 @ .9
Extra White	.18 @ .24
Fish, liquid, 50 gal. bbls., per gal.	.60 @ 1.20
Foot Stock, White	.12 @ .14
Foot Stock, Brown	.9 @ .11
German Common Hide	.10 @ .12
German Hide	.12 @ .18
French	.13 @ .15
Irish	.10 @ .12
Low Grade	.10 @ .12
Medium White	.14 @ .17

Gum Shellac—

Gum Shellac—	per lb
Bleached, Commercial	.29 @ .22
Bone Dry	.25 @ .27
Buttton I.	.31 @ .40
Diamond I.	.47 @ .48
Fine Orange	.29 @ .32
A. C. Garnet	.23 @ .24
G. A. L.	.18 @ .19
Kala Buttton	.17 @ .18
D. C.	.48 @ .49
Octagon B.	.38 @ .40
T. N.	.24 @ .25
V. S. O.	.47 @ .48

Colors in Oil—

Colors in Oil—	per lb
Black, Lampblack	.13 @ .14
Blue, Chinese	.36 @ .46
Blue, Prussian	.32 @ .36
Blue, Ultramarine	.13 @ .16
Brown, Vandyke	.11 @ .14
Green, Chrome	.12 @ .16
Green, Paris	.02 @ .21
Sienna, Raw	.12 @ .15
Sienna, Burnt	.12 @ .15
Umber, Raw	.11 @ .14
Umber, Burnt	.11 @ .14

White Lead, Zinc, &c.—

White Lead, Zinc, &c.—	per lb
Lead, English white, in Oil	.10 1/2 @ .10 3/4
Lead, American White:	
Lots of 500 lb or over, in Oil	.06 @ .06 1/2
Lots less than 500 lb, in Oil	.07 @ .07 1/2
Lead, White, in oil, 25 lb tin	.07 @ .07 1/2
Lead, White, in oil, 12 1/2 lb tin	.07 @ .07 1/2
Lead, White, in oil, 1 to 5 lb	.07 @ .07 1/2
assorted tins	.06 @ .06 1/2
Lead, American, Terms: On lots of 500 lbs and over 2% for cash if paid in 15 days from date of invoice.	

Zinc, Dry—

Zinc, Dry—	per lb
American, dry	.5 1/2 @ .5 3/4
Red Seal (French process)	.6 1/2 @ .7
Green Seal (French process)	.7 1/2 @ .7 3/4
German Red Seal (French process)	.6 1/2 @ .6 3/4
Green Seal	.7 1/2 @ .7 3/4
White Seal	.7 1/2 @ .8 1/2
French, Red Seal	.8 1/2 @ .8 3/4
Green Seal	.10 1/2 @ .10 3/4

Dry Colors—

Dry Colors—	per lb
Black, Carbon	.6 1/2 @ .10
Black Drop, American	.3 1/2 @ .8
Black Drop, English	.5 @ .15
Black, Ivory	.16 @ .20
Lamp, commercial	.4 @ .6

Colors in Oil—	per lb
Blue, Celestial	.4 @ .6
Blue, Chinese	.31 @ .33
Blue, Prussian	.29 @ .31
Blue, Ultramarine	.3 1/2 @ .15
Brown, Spanish	.1 1/2 @ .1
Carmine, No. 40	\$3.10 @ 3.25
Green, Chrome, ordinary	.3 1/2 @ .5
Green, Chrome, pure	.17 @ .25
Lead, Red, bbls., 1/2 bbls., kegs	@ .6 1/2
Litharge, bbls., 1/2 bbls., kegs	@ .6 1/2
Ocher, American	per ton \$8.50 @ 16.00
American Golden	.2 1/2 @ 3 1/4
French	.1 1/2 @ .2
Foreign Golden	.3 @ .4
Orange Mineral, English	.10 @ .12
French	.12 @ .13
German	.12 @ .13
American	.8 1/2 @ .8 3/4
Red, Indian, English	.4 1/2 @ .6
American	.3 @ .3 1/4
Red, Turkey, English	.4 @ .10
Red, Tuscan, English	.7 @ .10
Red, Venetian, Amer.	per 100 lb \$0.50 @ 1.25
English	per 100 lb \$1.15 @ 1.60
Sienna, Italian, Burnt and Powdered	.3 @ .9
Italian, Raw Powdered	.3 @ .7
American, Raw	.1 1/2 @ .2
American Burnt and Pow'd	.1 1/2 @ .2
Talc, French	per ton \$18.00 @ 25.00
American	per ton 15.00 @ 25.00
Terra Alba, French	per 100 lb .90 @ 1.00
English	per 100 lb .80 @ 1.00
American	per 100 lb .75 @ .80
American	per 100 lb .60 @ .65
Umber, T'fey, Bnt. & Pow.	.2 1/2 @ .3
Turkey, Raw and Powdered	.2 1/2 @ .3
Burnt, American	.1 1/2 @ .2
Raw, American	.1 1/2 @ .2
Yellow, Chrome, Pure	.13 1/2 @ .15
Vermilion, American Lead	.7 @ .25
Onicksilver, bulk	.6 @ .
Onicksilver, bags	.6 @ .66
English, Imported	.6 @ .70
Chinese	\$0.90 @ 1.00

Current Hardware Prices.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer—are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33% @ 33% & 10% signifies

that the price of the goods in question ranges from 33% per cent. discount to 33% and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued May, 1907, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—"The Iron Age Standard Hardware Lists" contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters, Blind—

Columbian and Domestic.....33%
North's.....10%
Zimmerman's—See Fasteners, Blind.

Window Stop—

Ives' Patent.....35%
Taplin's Perfection.....35%

Ammunition—See Caps, Cartridges, Shells, &c.

Anti-Rattlers—

Fernald Mfg. Co. Burton Anti-Rattlers, 1/2 doz. pairs, Nos. 1, \$0.75; 2, \$0.60; 4, \$1.00; 5, \$0.50.
Fernald Quick Shifter, 1/2 doz. pairs.....\$2.00@3.00

Anvils—American—

Eagle Anvils.....1/2 lb. @ 84¢
Hay-Budden, Wrought.....1/2 lb. @ 94¢
Trenton.....1/2 lb. @ 94¢

Imported—

Swedish Solid Steel Sisco, Superior, 1/2 lb. @ 104¢
Peter Wright & Sons, 1/2 lb. 84 to 349 lb. 11¢; 350 to 600 lb. 11 1/2¢

Anvil, Vice and Drill—

Millers Falls Co., \$18.00.....15¢10%

Apple Parers—See Parers, Apple, &c.

Aprons, Blacksmiths'—

Livingston Nail Co.....10%

Augers and Bits—

Com. Double Spur.....75¢10@80%
Jennings' Patn., Bright, 65¢10@70%
Black Lip or Blued.....65¢10@65¢
Boring Mach. Augers.....70¢
Car Bits, 12-in. twist.....40¢10%
Ford's Auger and Car Bits.....40¢
Ft. Washington Auger Co., Concord's.....35%
Forstner Pat. Auger Bits.....25%
C. E. Jennings & Co., No. 10 ext. lip, R. Jennings' list.....25¢7 1/2%

No. 30, R. Jennings' list.....25¢10@24%
Russell Jennings'.....25¢10@24%
L'Homedieu Car Bits.....15%
Mayhew's Countersink Bits.....45%
Pugh's Black.....20%
Pugh's Jennings' Pattern.....35%
Snell's Auger Bits.....60%
Snell's Bell Hangers' Bits.....60%
Snell's Car Bits, 12-in. twist.....60%
Snell's King Auger Bits.....50%
Wright's Jennings' Bits.....50%

Bit Stock Drills—

See Drills, Twist.

Expansive Bits—

Clark's Pattern, No. 1, 1/2 doz., \$26;
No. 2, \$18.....60¢10%
Ford's, Clark's Pattern.....65¢5%
C. E. Jennings & Co., Steer's Pat., 25%
Lavigne Pat., small size, \$18.00; large size, \$26.00.....60¢10%
Swan's.....60%

Gimlet Bits—

Common Dbl. Cut.....Per gro. \$3.00@3.25
German Pattern, Nos. 1 to 10, \$4.75; 11 to 13, \$5.75

Hollow Augers—

Bonney Pat., per doz.....\$5.50@6.00
Ames.....25¢10%
Universal.....20%

Ship Augers and Bits—

Ford's.....40¢10@45%
C. E. Jennings & Co., L'Homedieu's.....6%
Watrous'.....33%&7 1/2%
Snell's.....48%

Awl Hfts—See Handles, Mechanics' Tool.

Awls—

Brad Awls:
Handled.....gro. \$2.75@3.00
Unhdd, Shldered.....gro. \$3.60@66¢
Unhdd, Patent.....gro. \$6.60@70¢
Peg Awls:
Unhdd, Patent.....gro. \$1.31@3 1/2¢
Unhdd, Shldered.....gro. \$1.65@70¢
Scratch Awls:
Handled, Com.....gro. \$3.50@4.00
Handled, Socket.....gro. \$11.50@12.00

Awl and Tool Sets—See Sets, Awl and Tool.

Axes—

Single Bit, base weights: Per doz.
First Quality.....\$4.75@5.00
Second Quality.....\$4.25@4.50
Double Bit, base weights:
First Quality.....\$7.00@7.50
Second Quality.....\$6.50@6.75

Axle Grease—

See Grease, Axle.

Axles—

Concord, Loose Collar.....44¢5¢
Concord, Solid Collar.....44¢5¢
No. 1 Common, Loose.....34¢4 1/2¢
No. 1 1/2 Com., New Style.....44¢5¢
No. 2 Solid Collar.....44¢5¢
Half Patent:
Nos. 7, 8, 11 and 12.....65¢65¢10%
Nos. 13 to 14.....65¢65¢10%
Nos. 15 to 18.....70¢70¢10%
Nos. 19 to 22.....70¢70¢10%

Boxes, Axles—

Common and Concord, not turned.....1/2 lb. 5¢10¢
Common and Concord, turned.....1/2 lb. 6¢17¢
Half Patent.....1/2 lb. 9 1/2¢10¢

Bait—

Fishing—

Hendryx.....20%
A Bait.....25%
B Bait.....25%
Competitor Bait.....20%&5%

Balances—

Sash—

Caldwell new list.....50¢10%
Pullman.....50¢10%

Spring—

Spring Balances.....50¢10@60%
Chatillon's:
Light Spg. Balances.....50¢50¢10%
Straight Balances.....40¢40¢10%
Circular Balances.....50¢10%
Large Dial.....30%

Barb Wire—See Wire, Barb.

Bars—

Crow—

Steel Crowbars, 10 to 40 lb. per lb., 2 1/4 @ 2 1/2¢

Towel—

No. 10 Ideal, Nickel Plate.....1/2 gro. \$8.50

Beam, Scale—

Scale Beams.....40%
Chatillon's No. 1.....30%
Chatillon's No. 2.....40%

Beaters, Carpet—

Holt-Lyon Co.,
No. 12 Wire Coppered 1/2 doz. \$0.80;
Tinned.....\$0.85
No. 11 Wire Coppered 1/2 doz. \$1.15;
Tinned.....\$1.20
No. 10 Wire Tinned.....1/2 doz. \$1.50

Beaters Egg—

Holt-Lyon Co.,
Holt, per doz., No. 5, Jap'd, \$0.80;
No. A, Jap'd, \$1.15; No. B, Jap'd, \$1.85; No. 6, Jap'd, \$1.65.
Lyon, Jap'd, per doz., No. 2, \$1.35.

Taplin Mfg. Co.,
Improved Dover, per gro., No. 60, \$6.00; No. 75, \$6.50; No. 100, \$7.00;
No. 102, Tin'd, \$8.50; No. 150, Hotel, \$15.00; No. 132, Hotel Tin'd, \$17.00; No. 200, Tumbler, \$3.50; No. 202, Tumbler Tin'd, \$9.50; No. 300, Mammoth, per doz., \$25.00.

Turner & Seymour Mfg. Co.,
T. & S. Dover.....\$6.50

Bellows—

Blacksmith, Standard List:
Split Leather.....60¢10@65%
Grain Leather.....50¢50¢10%

Hand—

Inch.....6 7 8 9 10
Doz.....\$5.00 5.50 6.00 6.50 7.50

Molders—

Inch.....10 12 14 16
Doz.....\$7.50 9.00 12.00 15.00

Bells—Cow—

Ordinary Goods.....75¢80¢75¢10¢5%
High grade.....70¢100¢75%
Jersey.....75¢10%
Texas Star.....50%

Door—

Home, R. & E. Mfg. Co.'s.....55¢10%

Hand—

Polished, Brass.....50¢10@60%
White Metal.....50¢10@50¢10¢5%
Nickel Plated.....50¢5%
Sticks.....50¢5%
Cone's Globe Hand Bells.....33%@35%

Miscellaneous—

Farm Bells.....1/2 lb. 2 1/4 @ 2 1/2¢
Church and School.....60¢60¢5%

Belting—

Leather—

Standard.....70¢10@70¢10¢5%
Light.....75¢10%
Cut Leather Lacing.....50¢10%
Leather Lacing Sides, per sq. ft. 22 @ 23¢

Rubber—

Competition (Low Grade), 70¢10@75¢5%
Standard.....60¢60¢10%
Best Grades.....33% @ 40¢10%

Bench Stops—

See Stops, Bench

Benders and Upsetters, Tire—

Green River Tire Benders and Upsetters.....20%

Bicycle Goods—

John S. Leng's Son & Co.'s 1907 list:
Chain, Parts, Spokes.....50%
Tubes.....60%

Bits—

Auger, Gimlet, Bit Stock Drills, &c.—See Augers and Bits.

Blocks Tackle—

Common Wooden.....75¢75¢5%
B. & L. B. Co.,
Boston Wood Snatch, 50%; Eclipse Steel, 75%; Hollow Steel, 50¢10%
Star Wire Rope, 50%; Tarbox Metal Snatch, 50%; Tarbox New Style Steel, 50¢10%; Wire Rope Snatch, 50%
Lane's Patent Automatic Lock and Junior.....30%
See also Machines, Hoisting.

Boards, Stove—

Paper and Wood Lined.....55%
Embossed.....55%

Boards, Wash—

See Washboards.

Bobs, Plumb—

Keuffel & Esser Co.....33%&5%

Bolts

Carriage, Machine, &c.—
Common Carriage (cut thread):
1/2 x 6 and smaller.....75¢5@—%
Larger and longer.....70¢6@—%
Phila. Eagle, \$3.00 list.....80¢6@—%
Roll Ends.....70¢6@—%
Machine (Cut Thread):
1/2 x 4 and smaller.....75¢10@—%
Larger and longer.....70¢6@—%

Door and Shutter—

Cast Iron Barrel, Japanned, Round Brass Knobs:
Inch.....3 4 5 6 8
Per doz.....\$0.30 .35 .45 .60 .80
Cast Iron Spring Foot, Jap'd:
Inch.....6 8 10
Per doz.....\$1.20 1.50 2.25
Cast Iron Chain, Flat, Japanned:
Inch.....6 8 10
Per doz.....\$1.00 1.40 1.65
Cast Iron Flat Shutter, Jap'd, Brass Knobs:
Inch.....6 8 10
Per doz.....\$0.75 .95 1.25
Wrought Barrel Jap'd, 80¢10@80¢10%
Barrel Bronzed.....60¢10%
Spring.....70¢10@70¢10¢10%
Shutter.....50¢5@50¢10¢5%
Square Neck.....75¢75¢10%
Square.....70¢10¢10%
Ives' Patent Door.....55%
Ives' Wrought Metal.....45%

Expansion—

F. H. Evans' Crescent.....40¢60%
Richards Mfg. Co.....55¢10%
Steward & Romain Mfg. Co.:
Style No. 13, Double.....60%
Style No. 1, Single.....60%
Style No. 100, Dbl. Jaw, Single.....55%
Lag Screws.....65%

Plow and Stove—

Plow.....65¢65¢70%
Stove.....85¢85¢5%

Tire—

Common Iron.....80%
Norway Iron.....80%
American Screw Co.:
Norway Phila., list Oct. 16, '84.....80%
Eagle Phila., list Oct. 16, '84.....82 1/2%
Bay State, list Dec. 28, '99.....80%
Franklin Moore Co.:
Norway Phila., list Oct. 16, '84.....80%
Eagle Phila., list Oct. 16, '84.....82 1/2%
Eclipse, list Dec. 28, '99.....80%
Russell, Burdall & Ward Bolt & Nut Co.:
Empire, list Dec. 28, '99.....80%
Norway Phila., list Oct. '84.....80%
Eagle.....82 1/2%
Shelton Co.:
Tiger Brand, list Dec. 28, '99.....80%
Phila., Eagle, list Oct. 16, 1884.....82 1/2%
Upon Nut Co.:
Tire Bolts.....72 1/2%

Borers, Bung—

Borers Bung, Ring, with Handle:
Inch.....1 1/2 1 3/4 2
Per doz.....\$4.80 5.60 6.40 8.00
Inch.....2 1/2 3 1/2 4 1/2
Per doz.....\$8.65 11.50
Enterprise Mfg. Co., No. 1, \$1.25; No. 2, \$1.75; No. 3, \$2.50 each.....25%

Boxes, Mitre—

C. E. Jennings & Co.....25%
Langdon, New Langdon and Langdon Improved, 20¢10%; Langdon Acme.....15¢10%
Perfection.....40%
Seavey.....45%

Braces—

Common Ball, American.....\$1.50
Barber's.....50¢10@60¢10%
Fray's Genuine Spofford's.....60%
Fray's No. 61, 166, 206, 614.....50%
C. E. Jennings & Co.....50¢5%
Mayhew's Ratchet.....60%
Mayhew's Quick Action Hay Pat. 50%
Millers Falls Drill Braces.....25¢10%
P. S. & W. Co., Peck's Pat.....60¢10%

Brackets—

Wrought Steel.....70¢10@75¢10%
Bradley Metal Clasp, 80¢10@80¢10%
Griffin's Pressed Steel.....75¢75¢10%
Griffin's Folding Brackets.....70¢10%
Taplin Victor Handy Egg Beater Bracket.....1/2 doz. \$1.50

Bright Wire Goods—

See Wire and Wire Goods.

Broilers—

Kilbourne Mfg. Co.....75¢20%
Wire Goods Co.....75%

Buckets, Galvanized—

Mfr's list, price per gross.
Quart.....10 12 14
Water, Reg.....25.35 28.00 32.00
Water, Hvy.....45.35 48.00 52.00
Fire, Rd. Btm.....32.00 34.65 38.65
Well.....37.35 41.35 45.35

Bull Rings—See Rings, Bull.

Butts—

Brass—

Wrought, High List, Oct. 26, '06, 55%
Cast Brass, Tiebout's.....40%

Cast Iron—

Fast Joint, Broad.....40¢10@50%
Fast Joint, Narrow.....40¢10@50%
Loose Joint.....70¢10@75%
Loose Pin.....70¢10@75%
Mayer's Hinges.....70¢10@75%
Parliament Butts.....70¢10@75%

Wrought Steel—

Bright:
Light Narrow, Light Reversible.....70¢5%
Reversible and Broad.....70¢5%
Loose Joint, Narrow, Light Inside Blind, &c.....70%
Back Flaps, Table Chest, 65% Japanned.
Light Narrow, Loose Pin.....40¢5%
Light Narrow, Ball Tip.....60%
Broad.....40¢5%
Steeple Tipped.....70%
Ball Tipped.....70%

Extra, 10¢

Cages, Bird—

Hendryx Brass: Series 3000, 5000,
1100, net list; 1200, 15%; 200, 300,
800
Hendryx Bronze: Series 700, 800, 30
Hendryx Enameled.....35%

Calipers—See Compasses.**Calks, Toe and Heel—**

Blunt, 1 prong, per lb., $1\frac{1}{4}$ @ $1\frac{3}{4}$ ¢
Sharp, 1 prong, per lb., $1\frac{1}{4}$ @ $1\frac{3}{4}$ ¢
Burke's, Blunt, $1\frac{1}{4}$ ¢; Sharp, $1\frac{1}{4}$ ¢
Lautier, Blunt, $1\frac{1}{4}$ ¢; Sharp, $1\frac{1}{4}$ ¢
Perkins', Blunt, $\frac{1}{2}$ lb., 3.5¢; Sharp,
4.15¢

Can Openers—

See Openers, Can.

Caps, Percussion—

Eley's E. B.....52¢@55¢
G. D.....per M $3\frac{1}{2}$ @35¢
F. L.....per M $4\frac{1}{2}$ @42¢
G. E.....per M $4\frac{1}{2}$ @40¢
Musket.....per M $6\frac{1}{2}$ @53¢

Primers—

Berdan Primers, $\frac{1}{2}$ per M.....20¢5%
Primer Shells and Bullets.....15¢10%
All other primers per M..... $1\frac{1}{2}$ @1.60

Carpet Stretchers—

See Stretchers, Carpet.

Cartridges—

Blank Cartridges:
32 C. F., $\frac{1}{2}$ doz.....10¢5%
38 C. F., $\frac{1}{2}$ doz.....10¢5%
22 cal. Rim, $\frac{1}{2}$ doz.....10¢5%
32 cal. Rim, $\frac{1}{2}$ doz.....10¢5%
B. B. Caps, Con. Ball, Sugd. $\frac{1}{2}$ doz..... $1\frac{1}{2}$ @1.90
B. B. Caps, Round Ball..... $1\frac{1}{2}$ @1.90
Central Fire.....25¢
Target and Sporting Rifle.....15¢5%
Primed Shells and Bullets.....15¢10%
Rim Fire, Sporting.....50¢
Rim Fire, Military.....15¢5%

Casters—

Bed.....65¢@10¢
Plate.....60¢5%
Philadelphia.....70¢@10¢
Acme, Ball Bearing.....35¢
Gem (Roller Bearing).....70¢@10¢
Steel Gem.....50¢
Standard Ball Bearing.....40¢10%
Yale (Double Wheel) low list.....40¢10%

Cattle Leaders—

See Leaders, Cattle.

Chain, Proof Coil—

American Coil, Straight Link:
3-16 $\frac{1}{4}$, 5-16 $\frac{3}{8}$, 7-16 $\frac{1}{2}$, 9-16 $\frac{3}{4}$,
1-16 1, 1-16 1 $\frac{1}{2}$, 1-16 2, 1-16 2 $\frac{1}{2}$,
1-16 3, 1-16 3 $\frac{1}{2}$, 1-16 4, 1-16 4 $\frac{1}{2}$,
1-16 5, 1-16 5 $\frac{1}{2}$, 1-16 6, 1-16 6 $\frac{1}{2}$,
1-16 7, 1-16 7 $\frac{1}{2}$, 1-16 8, 1-16 8 $\frac{1}{2}$,
1-16 9, 1-16 9 $\frac{1}{2}$, 1-16 10, 1-16 10 $\frac{1}{2}$,
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Fasteners, Blind—

Zimmerman's 50&10%
Walling's 40&10%
Upson's Patent 90%

Cord and Weight—

Ives and Titau 33%
Corrugated—
Acme Corrugated Fasteners 70%

Faucets—

Cork Lined 50&10%
Metallic Key, Leather Lined 40&10%

Red Cedar 40&10%
Petroleum 70&10%
H. & L. B. Co. 60&10%

Metal Key 60&10%
Star 60&10%
West Lock 60&10%

John Sommer's Peerless Tin Key 60&10%
John Sommer's Rose Tin Key 60&10%
John Sommer's Victor Mtl. Key 60&10%

John Sommer's Duplex Metal Key 60&10%
John Sommer's Diamond Lock 60&10%
John Sommer's I.X.L. Cork Lined 60&10%

John Sommer's Reliable Cork Lined 60&10%
John Sommer's Chicago Cork Lined 60&10%
John Sommer's O. K. Cork Lined 60&10%

John Sommer's No Brand, Cedar 60&10%
John Sommer's Perfection, Cedar 60&10%
Self Measuring 40&10%

Enterprise, 1/2 doz. \$36.00 40&10%
Lane's, 1/2 doz. \$36.00 40&10%
National Measuring, 1/2 doz. \$36.00 40&10%

Felloe Plates—

See Plates, Felloe.

Files— Domestic—

List Nov. 1, 1899.

Best Brands 70&10%
Standard Brands 75&10%
Lower Grade 75&10%

Imported—

Stubs' Tapers, Stubs' List, July 24, '97 33-1-3-40%

Fixtures, Fire Door—

Allith Underwriters' Approved 50%
Richards Mfg. Co.:

Universal, No. 103; Special, No. 104 75%
Fusible Links, No. 96 60%
Expansion Bolts, No. 107 60&10%

Grindstone—

Net Prices: 15 17 19 21
Per doz. \$3.60 3.85 4.15 4.65
P. S. & W. Co. 25%
Leading Hardware Co. 60%

Fodder Squeezers—

See Compressors.

Forks—

NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.

Iowa Dig-Ezy Potato 60&10%
Victor, Hay 60&10%
Victor, Header 60&10%

Champion, Hay 60&10%
Champion, Header 60&10%
Champion, Manure 60&10%

Columbia, Hay 60&10%
Columbia, Header 60&10%
Columbia, Manure 60&10%

Hawkeye Wood Barley 60&10%
W. & C. Potato Digger 60&10%
Acme Hay 60&10%

Acme Manure, 4 Line 60&10%
Dakota Header 60&10%
Jackson Steel Barley 60&10%

Kansas Header 60&10%
W. & C. Favorite Wood Barley 60&10%
Plated—See Spoons.

Frames— Wood Saw—

White, 8'x1 Bar, per doz. 75¢
Red, 8'x1 Bar, per doz. \$1.00
Red, Dbl. Brace, per doz. \$1.40

Freezers, Ice Cream—

Qt. 1 2 3 4
Each \$1.25 \$1.60 \$1.90 \$2.20 \$2.50

Fruit and Jelly Presses—

See Presses, Fruit and Jelly.

Fry Pans—See Pans, Fry.**Fuse— Per 1000 Feet.**

Hemp \$2.75
Cotton \$2.20
Waterproof Sgl. Taped 3.65
Waterproof Dbl. Taped 4.40
Waterproof Tpl. Taped 5.15

Gates, Molasses and Oil—
Stebbins' Pattern 80&10%

Gauges—

Marking, Mortise, &c. 50&10%
Chapin-Stephens Co. 50&10%
Marking, Mortise, &c. 50&10%
Dixon's Marking, Mortise, &c. 50&10%

Wire, Brown & Sharpe's 33%
Wire, Morse's 25%
Wire, P. S. & W. Co. 33%

Gimlets— Single Cut—

Numbered assortments, per gro.
Nail, Metal, No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000

Spike, Metal, No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 8

Handled—

NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.

Cronk's Weeding, No. 1, \$2.00; No. 2, \$2.50
Star Double Bit.....\$3.20
Ft. Madison Cotton Hoe.....70¢@10¢
Ft. Madison Crescent Cultivator Hoe.....
doz.....70¢@10¢
Ft. Madison Mattock Hoes.....
Regular Weight.....doz. 40¢@5¢
Junior Size.....doz. \$4.00
Ft. Madison Sprouting Hoe, doz.....
60¢@10¢
Ft. Madison Dixie Tobacco Hoe.....
75¢@10¢
Kretzinger's Cut Easy.....70¢@10¢
Warren Hoe.....45¢@10¢
B. B. C. Ivanhoe.....75¢@10¢
B. B. 6 in. Cultivator Hoe.....\$3.40
C. E. Weeding.....net, \$4.35
W. & C. L. Mining Shovel Hoe, \$4.00, \$5.25

Hoisting Apparatus—

See Machines, Hoisting.

Holders—Bit—

Angular, doz. \$24.00.....45¢@10¢

Door—

Bardsley's, Iron, 40%; Brass and
Bronze.....50¢
Empire.....50¢
Pullman.....25¢
Richards Mfg. Co., No. 117, Ever-
ready, 40%; Nos. 118, 119, Sure
Grip.....50¢
Superior.....33¼%

File and Tool—

Nicholson File Holders and File
Handles.....33¼¢@40¢

Fruit Jar—

Triumph Fruit Jar Holder, doz. gross,
\$10.80; doz. \$12.25

Trace and Rein—

Fernald Double Trace Holder, doz.
pairs.....\$1.25
Dash Rein Holder, doz. pairs, \$1.25

Hones—Razor—

Pike Mfg. Co., Belgian and Swat,
50%; German.....53¼%

Hooks—Cast Iron—

Bird Cage, Reading.....40¢
Clothes Line, Reading List.....40¢
Coat and Hat, Reading.....45¢@20¢
Coat and Hat, Wrightsville.....60¢@5¢
Harness, Reading List.....40¢

Wire—

Belt.....80¢
Wire C. & H. Hooks.....80¢
Bradley Metal Clasp Wire, Coat and
Hat, 70¢@10¢; Ceiling.....70¢@10¢
Columbian Hdw. Co., Gem.....70¢@5¢
Parker Wire Goods Co., King.....70¢@10¢
Wire Goods Co.,
Acme, 60¢@10¢; Chief, 70¢; Crown,
75¢; Czar, 65¢; V. Brace, 75¢;
Czar Harness, 50¢@10¢

Wrought Iron—

Doz. 6 in., per doz., \$1.00; 8 in.,
\$1.25; 10 in., \$2.50.
Cotton.....doz. \$1.05@1.25
Wrought Staples, Hooks, &c.—
See Wrought Goods.

Miscellaneous—

Hooks, Bench, see Stops, Bench.
Rush, Light, doz., \$6.20; Medium,
\$6.75; Heavy, \$7.65
Grass, best, all sizes, per doz. \$3.50
Grass, common grades, all sizes,
per doz.....\$1.50
Whiffletrees.....lb. 5¢@6¢
Hooks and Eyes:
Brass.....60¢@60¢@10¢
Malleable Iron.....70¢@70¢@10¢
Covey Mfg. Co. Gate and Acuticle
Hooks.....40¢
Ft. Madison Cut-Easy Corn Hooks,
doz. \$3.25 net
Turner & Stanton Co. Cup and
Shoulder.....80¢@10¢
Bench Hooks—See Bench Stops.
Corn Hooks—See Knives, Corn.

Horse Nails—

See Nails, Horse.

Horseshoes—

See Shoes, Horses.

Hose, Rubber—

Garden Hose, ¾-inch:
Competition.....ft. 8¢@6¢
3 ply Guaranteed.....ft. 8¢@9¢
4 ply Guaranteed.....ft. 10¢@11¢
Cotton Garden, ¾-in., coupled:
Low Grade.....ft. 8¢@9¢
Fair Quality.....ft. 10¢@11¢

Irons—Sad—

From 4 to 10.....lb. 30¢@34¢
B. B. Sad Irons.....lb. 34¢@35¢
Mrs. Potts, cents per set:
Nos. 50 55 60 65
Jap'd Tops.....83 80 93 91
Tin'd Tops.....88 85 98 95
New England Pressing.....lb. 3¢@4¢

Bar and Corner—

Richards Mfg. Co., Bar, 60¢@10¢;
Corner.....60¢

Pinking—

Pinking Irons.....doz. 80¢

Irons, Soldering

See Copiers.

Jacks, Wagon—

Covert Mfg. Co.:
Auto Screw.....30¢@2¢; Steel, 45¢
Lockport.....30¢@5¢
Lane's Steel.....30¢@5¢
Richards' Tiger Steel, No. 130.....50¢@10¢
Smith & Hemenway Co.'s.....25¢

Ladder—

Richards Mfg. Co., Ladder Jacks.....50¢

Kettles—

Brass, Spun, Plain.....20¢@25¢
Enamelled and Cast Iron—See Ware,
Hollow.

Knives—

Butcher, Kitchen, &c.—

Forster Bros' Butcher, &c.....60¢
Wilkinson Shear & Cutlery Co.....60¢

Corn—

Columbian Cutlery Co., Wilcut
Brand Knives and Hooks.....60¢
Wilmington Acme, doz., \$2.65;
Dent, \$2.75; Adj. Serrated, \$2.20;
Serrated, \$2.10; Yankee No. 1, \$1.50;
Yankee No. 2, \$1.15.

Drawing—

Standard List.....80¢@10¢—
C. E. Jennings & Co., Nos. 45, 16,
25¢@10¢
Jennings & Griffin, Nos. 41, 42,
66¢@10¢
Swan's.....66¢@10¢
Watrous.....16¢@10¢
L. & J. White.....20¢@25¢

Hay and Straw—

Serrated Edge, per doz. \$3.50@5.75
Iwan's Sickle Edge.....doz. \$9.50
Iwan's Serrated.....doz. \$10.00

Miscellaneous—

Farriers'.....doz. \$2.60@3.55
Wostenholm's.....doz. \$3.00@3.25

Knobs—

Base, 2½-inch, Birch, or Maple,
Rubber Tip.....gro. \$1.25@1.40
Carriage, Jap., all sizes.....
gro. 40¢@45¢
Door, Mineral.....doz. 65¢@70¢
Door, Por. Jap'd.....doz. 70¢@75¢
Door, Por. Nickel.....doz. \$2.05@2.15
Bardsley's Wood Door, Shutters, &c. 15%

Lacing, Leather—

See Belting, Leather—

Ladders, Store, &c.—

Allith Mfg. Co., Reliable.....50¢
Lane's Store.....25¢
Myers' Noiseless Store Ladders.....50¢
Richards Mfg. Co.:
Improved Noiseless, No. 112.....50¢
Climax Shelf, No. 113.....50¢
Trolley, No. 109.....50¢

Ladies, Melting—

L. & G. Mfg. Co. (low list).....20¢
P. S. & W.....40¢@10¢
Reading.....60¢

Lanterns—Tubular—

Regular, No. 0.....doz. \$4.35@4.50
Side Lift, No. 0.....doz. \$4.60@4.75
Hinge Globe, No. 0.....doz. \$4.60@4.75
Other Styles.....40¢@40¢@10¢

Bull's Eye Police—

3-inch.....\$4.25@4.50

Latches—Thumb—

Roggin's Latches, with screw.....
doz. 35¢@40¢

Door—

Allith Mfg. Co., Reliable and Alle-
gator, 50%; Reliable Cold Storage, 50%
Cronk & Carrier Mfg. Co., No. 101,
\$1.75; No. 4, \$2.25; Colors, No. 3½,
\$1.75; No. 4, \$2.25; No. 4½, \$2.75;
Linen, No. 3½, \$2.50; No. 4, \$3.50;
No. 4½, \$4.50.....20¢
Tent and Awning Lines: No. 5,
White Cotton, \$7.50; Drab Cotton,
\$8.50.....20¢
Clothes Lines, White Cotton: 50 ft.,
\$2.75; 60 ft., \$3.25; 70 ft., \$3.75; 75
feet.....\$2.10 1.80 1.65
Samson Cordage Works:
Solid Braided Chalk, Nos. 0 to 3, 40¢
Solid Braided Masons'.....30¢
Silver Lake Braided Chalk, No. 0,
\$6.00; No. 1, \$6.50; No. 2, \$7.00; No.
3, \$7.50.....\$7.00
Masons' Lines, Shade Cord, &c.:
White Cotton, No. 3½, \$1.50; No. 4,
\$2.00; No. 4½, \$2.50; Colors, No. 3½,
\$1.75; No. 4, \$2.25; No. 4½, \$2.75;
Linen, No. 3½, \$2.50; No. 4, \$3.50;
No. 4½, \$4.50.....20¢
Tent and Awning Lines: No. 5,
White Cotton, \$7.50; Drab Cotton,
\$8.50.....20¢
Clothes Lines, White Cotton: 50 ft.,
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Linen, No. 3½, \$2.50; No. 4, \$3.50;
No. 4½, \$4.50.....20¢
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\$1.75; No. 4, \$2.25; No. 4½, \$2.75;
Linen, No. 3½, \$2.50; No. 4, \$3.50;
No. 4½, \$4.50.....20¢
Tent and Awning Lines: No. 5,
White Cotton, \$7.50; Drab Cotton,
\$8.50.....20¢
Clothes Lines, White Cotton: 50 ft.,
\$2.75; 60 ft., \$3.25; 70 ft., \$3.75; 75
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Solid Braided Masons'.....30¢
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3, \$7.50.....\$7.00
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\$2.00; No. 4½, \$2.50; Colors, No. 3½,
\$1.75; No. 4, \$2.25; No. 4½, \$2.75;
Linen, No. 3½, \$2.50; No. 4, \$3.50;
No. 4½, \$4.50.....20¢
Tent and Awning Lines: No. 5,
White Cotton, \$7.50; Drab Cotton,
\$8.50.....20¢
Clothes Lines, White Cotton: 50 ft.,
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3, \$7.50.....\$7.00
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\$2.00; No. 4½, \$2.50; Colors, No. 3½,
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Linen, No. 3½, \$2.50; No. 4, \$3.50;
No. 4½, \$4.50.....20¢
Tent and Awning Lines: No. 5,
White Cotton, \$7.50; Drab Cotton,
\$8.50.....20¢
Clothes Lines, White Cotton: 50 ft.,
\$2.75; 60 ft., \$3.25; 70 ft., \$3.75; 75
feet.....\$2.10 1.80 1.65
Samson Cordage Works:
Solid Braided Chalk, Nos. 0 to 3, 40¢
Solid Braided Masons'.....30¢
Silver Lake Braided Chalk, No. 0,
\$6.00; No. 1, \$6.50; No. 2, \$7.00; No.
3, \$7.50.....\$7.00
Masons' Lines, Shade Cord, &c.:
White Cotton, No. 3½, \$1.50; No. 4,
\$2.00; No. 4½, \$2.50; Colors, No. 3½,
\$1.75; No. 4, \$2.25; No. 4½, \$2.75;
Linen, No. 3½, \$2.50; No. 4, \$3.50;
No. 4½, \$4.50.....20¢
Tent and Awning Lines: No. 5,
White Cotton, \$7.50; Drab Cotton,
\$8.50.....20¢
Clothes Lines, White Cotton: 50 ft.,
\$2.75; 60 ft., \$3.25; 70 ft., \$3.75; 75
feet.....\$2.10 1.80 1.65
Samson Cordage Works:
Solid Braided Chalk, Nos. 0 to 3, 40¢
Solid Braided Masons'.....30¢
Silver Lake Braided Chalk, No. 0,
\$6.00; No. 1, \$6.50; No. 2, \$7.00; No.
3, \$7.50.....\$7.00
Masons' Lines, Shade Cord, &c.:
White Cotton, No. 3½, \$1.50; No. 4,
\$2.00; No. 4½, \$2.50; Colors, No. 3½,
\$1.75; No. 4, \$2.25; No. 4½, \$2.75;
Linen, No. 3½, \$2.50; No. 4, \$3.50;
No. 4½, \$4.50.....20¢
Tent and Awning Lines: No. 5,
White Cotton, \$7.50; Drab Cotton,
\$8.50.....20¢
Clothes Lines, White Cotton: 50 ft.,
\$2.75; 60 ft., \$3.25; 70 ft., \$3.75; 75
feet.....\$2.10 1.80 1.65
Samson Cordage Works:
Solid Braided Chalk, Nos. 0 to 3, 40¢
Solid Braided Masons'.....30¢
Silver Lake Braided Chalk, No. 0,
\$6.00; No. 1, \$6.50; No. 2, \$7.00; No.
3, \$7.50.....\$7.00
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\$2.00; No. 4½, \$2.50; Colors, No. 3½,
\$1.75; No. 4, \$2.25; No. 4½, \$2.75;
Linen, No. 3½, \$2.50; No. 4, \$3.50;
No. 4½, \$4.50.....20¢
Tent and Awning Lines: No. 5,
White Cotton, \$7.50; Drab Cotton,
\$8.50.....20¢
Clothes Lines, White Cotton: 50 ft.,
\$2.75; 60 ft., \$3.25; 70 ft., \$3.75; 75
feet.....\$2.10 1.80 1.65
Samson Cordage Works:
Solid Braided Chalk, Nos. 0 to 3, 40¢
Solid Braided Masons'.....30¢
Silver Lake Braided Chalk, No. 0,
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Linen, No. 3½, \$2.50; No. 4, \$3.50;
No. 4½, \$4.50.....20¢
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\$8.50.....20¢
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Linen, No. 3½, \$2.50; No. 4, \$3.50;
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Linen, No. 3½, \$2.50; No. 4, \$3.50;
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Linen, No. 3½, \$2.50; No. 4, \$3.50;
No. 4½, \$4.50.....20¢
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Samson Cordage Works:
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Solid Braided Masons'.....30¢
Silver Lake Braided Chalk, No. 0,
\$6.00; No. 1, \$6.50; No. 2, \$7.00; No.
3, \$7.50.....\$7.00
Masons' Lines, Shade Cord, &c.:
White Cotton,

Saws—

Circular	45
Band	50@50&10
Butcher Saws	50
Cross Cuts	35
One-Man Cross Cut	40
Narrow Cross Cut	50
Hand, Rip and Panel	35&5
Miter Box and Compass	40
Mulay, Mill and Drag	45
Wood Saws	10&10
Chapin-Stephens Co.	
Turning Saws and Frames	30&30&10
Diamond Saw & Stamping Works	
Sterling Kitchen Saws	30&10&10

Disston's:	
Circular, Solid and Insulated Tooth	50
Band, 2 to 18 in. wide	60
Hand, 1 to 14	60
Crosscuts	45
Narrow Crosscuts	60
Mulay, Mill and Drag	50
Woodsaw Blades	25
Woodsaw Rods, Tinned	15
Hand Saws, Nos. 12, 99, 9, 16, 4100	
108, 120, 76, 77, 8	25
Hand Saws, Nos. 7, 107, 107 1/2, 1	25
0, 00, Combination	25
Compass, Key Hole, &c.	25
Butcher Saws and Blades	30

C. E. Jennings & Co.'s:	
Back Saws	16 1/2
Butcher Saws	25&7 1/2
Compass and Key Hole Saws	33 1/2&7 1/2
Framed Wood Saws	25&7 1/2
Hand Saws	12 1/2
Wood Saw Blades	33 1/2&7 1/2

Millers Falls:	
Butcher Saws	15&10
Star Saw Blades	15&10
Massachusetts Saw Works:	
Victor Kitchen Saws	40&10&50
Butcher Saws and Blades	30&40
Peace & Richardson's Hand Saws	30

Simonds':	
Circular Saws	45
Crescent Ground Cross Cut Saws	30
One-Man Cross Cuts	40&10
Gang Mill, Mulay and Drag Saws	45
Hand Saws	25&25 1/2
Butcher Saws	35&35 1/2
Hand Saws	25&25 1/2
Hand Saws, Bay State Brand	45
Compass, Key Hole, &c.	25&25 1/2
Wood Saws	40&4 1/2
Wheeler, Madden & Clemens Mfg.	
Co.'s Cross Cut Saws	50

Hack Saw Blades and Frames—

Atkins' Hack Saw Blades A & A A	25
Disston's:	
Concave Blades	25
Keystone Blades	35
Hack S Frames	30
Simonds' Hack Saw Blades	30
C. E. Jennings & Co.'s:	
Hack Saw Frames, Nos. 175, 180	40&7 1/2
Hack Saws, Nos. 175, 180, complete	40&7 1/2
Goodell's Hack Saw Blades	40&10
Griffin's Hack Saw Blades	35&35 1/2
Star Hack Saws and Blades	15&10
Sterling Hack Saw Blades	30&10&5
Sterling Hack Saw Frames	30&10&10
Sterling Power Hack Saw Machines	
each, No. 1, \$25.00; No. 2, \$30.00	10
Victor Hack Saw Blades	20
Victor Hack Saw Frames	40
Whitaker Mfg. Co.:	
National Hand Blades	40
National Hand Frames	30&5
National Power Blades	30&10

Scroll—

Barnes, No. 7, \$15	25
Barnes' Scroll Saw Blades	60
Barnes' Velocipede Power Scroll Saw	
without boring attachment	\$12
with boring attachment	\$20
Lester, complete	10.00
Rogers, complete	\$3.50 and \$4.00

Scales—

Union Platform, Plain	\$2.10 @ 2.20
Union Platform, Std.	\$2.20 @ 2.30
Chatillon's:	
Eureka	25
Favorite	40
Crocker's Trip Scales	40
The Standard Portables	40
The Standard R. R. and Wag-	
on	30&10

Scrapers—

Box, 1 Handle	doz. \$2.00 @ 2.25
Box, 2 Handle	doz. \$2.50 @ 2.60
Ship	Light, \$2.00; Heavy, \$4.50
Chapin-Stephens Co., Box	30&30&10
Richards Mfg. Co., Foot	60

Screws—Bench and Hand

Bench, Iron, doz., 1 in.	\$2.50 @
2 1/2; 1 1/2, \$3.00 @ 3.25; 1 1/4, \$3.50 @ 3.75	
Bench, Wood	20 @ 20&10
Hand, Wood	70&10 @ 70&10&10
Chapin-Stephens Co., Hand	70&70&10&2 1/2

Coach, Lag and Hand Rail—

Lag, Cone Point	80&5 @ 80&10
Coach, Gimlet Point	80 @ 80&5
Hand Rail	70&10 @ 75

Jack Screws—

Standard List	70&10 @ 75
Millers Falls	50&10 @ 10
Swett Iron Works	70&75

Machine—

Cut Thread, Iron, Brass or	
Bronze:	
Flat Head or Round Head	50 @ 50&10
Flat Head	40 @ 40&10

Rolled Thread, F. H. or R. H.	
Iron	75&10
F. H. or R. H., Brass, Nos.	
8 to 14	65&10

Set and Cap—

Set (Iron)	75&10&7 1/2
Set (Steel), net advance over	
Iron	25
Sq. Hd. Cap	70&10&7 1/2
Hex. Hd. Cap	70&10&7 1/2
Rd. Hd. Cap	50&7 1/2
Fitcher Hd. Cap	60&7 1/2

Wood—

List July 23, 1905.	
Flat Head, Iron	87 1/2&5
Round Head, Iron	85&5
Flat Head, Brass	80&5
Round Head, Brass	77 1/2&5
Flat Head, Bronze	75&5
Round Head, Bronze	72 1/2&5
Drive Screws	87 1/2&5

Scroll Saws—

See Saws, Scroll.

Scythes—

Gross, No. 1, Plain	\$7.00 @ 7.50
Clipper, Bronzed Webb	\$7.25 @ 7.75
No. 3 Clipper, Pol'd Webb	\$7.50 @ 8.00

No. 6 Clipper and Solid Steel.

Bush, Weed and Bramble, Nos.	
11, 12 and 13	\$7.25 @ 7.75
Grain, No. 1	\$9.00 @ 9.50
Bronzed Webb, No. 1	\$9.25 @ 9.75
Nos. 3 and 4 Clipper, Grain	\$9.50 @ 10.00
Solid Steel, No. 6	\$10.00 @ 10.50

Seeders, Raisin—

Enterprise	25 @ 30
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Sets— Awl and Tool—

Fray's Adl. Tool Handles, Nos. 1, \$12	
2, \$16; 3, \$12	
Midler's Adl. Tool Handles, No.	
1, \$12; No. 4, \$12; No. 5, \$18	20&10

Garden Tool Sets—

Ft. Madison Three Plovs, Hoe, Rake	
and Shovel	1 doz sets \$9.00

Sets, Nail—

Octagon	gro. \$3.50 @ 3.75
Buck Bros.	27 1/2
Cannon's Diamond Point	1 doz, \$12
Mayhew's	1 doz, \$9.00
Snell's Corrugated, Cup Pt.	40&10
Snell's Knurled, Cup Pt.	40&10
Victor Knurled Cup Pt.	1 doz, \$7.50

Rivet—

Regular list	75 @ 75&10
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Saw—

Atkin's:	
Criterion	40
Adjustable	40
Disston's Star, Monarch and Tri-	
umph	30
Morrill's No. 1	\$15.00
Nos. 3 and 4, Cross Cut	\$20.00
No. 5, Mill	\$30.00
Nos. 10, 11, 95	\$15.00
No. 1 Old Style	\$10.00
Special	\$16.25
Giant Royal Cross Cut	1 doz, \$8.00
Royal, Hand	1 doz, \$4.50
Taintor Positive	1 doz, \$6.75

Shaving—

Fox Shaving Sets, No. 30	1 doz, net, \$24.00
Smith & Hemenway Co.'s	75

Sharpeners, Knife—

Pike Mfg. Co.:	
Fast Cut Pocket Knife Honer	1 doz, \$1.50
Mounted Kitchen Sand Stone	1 doz, \$1.50
Natural Grit Carving Knife	1 doz, \$3.00
Hones, 1 doz	\$3.00
Quick Cut Emery Carving	1 doz, \$1.50
Knife Honer, 1 doz	\$1.50
Quick Edge Pocket Knife	1 doz, \$2.50

Skate—

Smith & Hemenway Co., Eureka	50
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Shaves, Spoke—

Iron	doz. \$1.25
Wood	doz. \$2.00
Bailer's (Stanley R. & L. Co.)	45
Chapin-Stephens Co.	30&30&10
Goodell's	1 doz, \$9.00

Shears—

Cast Iron	7 8 9 in.
Best	\$16.00 18.00 20.00 gro.
Good	\$13.00 15.00 17.00 gro.
Cheap	\$5.00 6.00 7.00 gro.

Straight Trimmers, &c.

Best quality Jap.	70 @ 70&10
Best quality Nickel	60 @ 60&10
Tailors' Shears	40 @ 40&10
Acme Cast Shears	40 @ 40&5
Heinrich's Tailor's Shears	10
Winckson Shear & Cutlery Co.	
Sheep, 1900 list	30&10&5
Grass	50&10
Horse or Mule	50&10
J. Wiss & Sons Co.:	
Best Quality Jap'd	60&10
Best Quality Nickeld	50&10
Tailors'	25

Tinners' Snips—

Steel Blades	20&5 @ 20&10
Steel Laid Blades	40&10 @ 50

Forged Handles, Steel Blades, Berlin	50
Heinrich's Snips	40
Jennings & Griffin Mfg. Co.'s 6 1/2 to	
10 in.	33 1/2&7 1/2
Niagara Snips	40
W. R. W. Forged Handles	25
J. Wiss & Sons Co.	40&10
Wiss Forged Steel	25

Pruning Shears—

Cronk's Hand Shears	33 1/2
Cronk's Wood Handle Shears	33 1/2
Disston's Combined Pruning Hook	25
and Saw 1/2 doz. \$18.00, 1/2 doz.	
Disston's Pruning Hook only, 1/2 doz.	25
\$12.00	
John T. Henry Mfg. Co.:	
Pruning Shears, all grades	40
P. S. & W. Co.	40&10
Columbian Cutlery Co.:	
Hedge, Wilcut Brand	60&10
Lawn and Border, Wilcut Brand	60&10

Sheaves—Sliding Door—

Reading	40
R. & E. list	15

Sliding Shutter—

Reading list	40
R. & E. list	10

Shells, Empty—

Brass Shells, Empty:	
Climax, 10 and 12 gauge	65&10
Club, Rival, 65&5; First Quality	60&5

Paper Shells, Empty:

New Rapid, 10, 12, 16 and 20 gauge	25&10
Climax, 10 and 12 gauge; Acme, 10,	
12, 16 and 20 gauge; Ideal, 12,	
16 and 20 gauge; Leader grade	25&5
Union, League, 12 and 12 gauge	
Rival Grade	25
New Climax, Deafance, 10, 12, 14,	
16 and 20 gauge; Climax, 14, 16	
and 20 gauge	20&5
Challenge, Monarch, 10, 12, 16 and	
20 gauge; League, Union, 14, 16	
and 20 gauge; Repeater Grade	20

Shells, Loaded—

Loaded with Black Powder	40
Loaded with Smokeless Powder	
medium grade	40&5
Loaded with Smokeless Powder	
high grade	40&10&10
Union Metallic Cartridge Co.:	
New Club, Black Powders	40
Nitro Club, Smokeless Powders	40&5
Arrow, Smokeless Powders	40&10&10
Winchester:	
Smokeless Repeater Grade	40&5
Smokeless Leader Grade	40&10&10
Black Powder	40

Shingles, Metal—Per Sq.

Edwards Mfg. Co.:	
Painted	Galv.
14 x 20	\$1.25 \$6.00
10 x 14	4.50 6.25
7 x 10	4.75 6.50
Wheeling Corrugating Co.:	
Dixie, 14 x 20 in.	\$4.25
Dixie, 10 x 14 in.	4.50
Dixie, 7 x 10 in.	5.00

Shoes, Horse, Mule, &c.—

F.o.b. Pittsburgh:	
Iron	per keg \$4.10
Steel	per keg \$3.85
Burden's, all sizes	1 keg \$3.90

Shot—

Drop, up to B	25-lb. bag, \$1.85
Drop, B and larger	2.10
Buck	2.10
Chilled	2.10
Dust	2.30

Shovels and Spades—

Association List, Nov. 15, 1902	40
Avery Stamping Co.	40

Snow Shovels—

Long Handle	\$3.25 @ \$3.50
Wood and Mail, D. Handle	\$3.75 @ \$4.00

Sieves and Sifters—

Hunter's Imitation	gro. \$9.50 @ 10.00
Hunter's Genuine	per gro. \$12.00 @ 12.50

Sifters, Ash—

Acme Ball Bearing Sales Co., Acme	
Automatic Ash Sifter, each	\$3.25
1 doz.	\$39.00

Sieves, Seamless Metallic

Per dozen:	
Mesh	14 16 18 20
Iron Wire	\$1.05 1.05 1.10 1.20
Tinned Wire	\$1.15 1.15 1.20 1.30

Sieves, Wooden Rim—

Nested, 10, 11 and 12 Inch	
Mesh 18, Nested	doz. \$0.90 @ 0.95
Mesh 20, Nested	doz. \$1.00 @ 1.05
Mesh 24, Nested	doz. \$1.30 @ 1.40

Sinks, Cast Iron—

Painted, Standard list:	
12 x 12 to 22 x 36 in.	60
20 x 40 to 24 x 50 in.	50
24 x 60 to 24 x 120 in.	30

Barnes' low list:

Up to and including 20 x 36 in.	50&5
20 x 40 to 24 x 50 in.	45

NOTE—There is not entire uniformity

in lists used by jobbers.

Skins, Wagon—

Cast Iron	70 @ 75&10
Steel	40 @ 45

Slates, School—

Factory Shipments.	
"D" Slates	50 @ 50&10
Eureka, Unexcelled Noiseless	
60&5 tens	
Victor A, Noiseless	60&5 tens & 5

Slaw Cutters—See Cutters.**Snaps, Harness—**

German	40 @ 40&10
Covert Mfg. Co.:	
Derby, 25; Yankee, 30&2; Yankee	
Roller, 30&2	
High Grade, 40; Trojan	40
Jockey	25

Scythe Stones—

Pike Mfg. Co., 1901 list:	
Black Diamond S. S.	gro. \$12.00
Lamotte S. S.	gro. \$11.00
White Mountain S. S.	gro. \$9.50
Green Mountain S. S.	gro. \$7.00
Extra Indian Pond S. S.	gro. \$5.00
No. 1 Indian Pond S. S.	gro. \$7.50
No. 2 Indian Pond S. S.	gro. \$5.00
Leader Red End S. S.	gro. \$5.00
Quick Cut Emery	gro. \$10.00
Pure Corundum	gro. \$18.00
Emery Scythe Rifles, 2 Coat. \$8.80	
Emery Scythe Rifles, 3 Coat. \$11.00	
Emery Scythe Rifles, 4 Coat. \$13.20	
Maintenance of 1904 list 33 1/2%	
Lectro (Artificial)	gro. \$7.00
Lightning (Artificial)	gro. \$18.00

Stoppers, Bottle—

Victor Bottle Stoppers gro. \$9.00

Stops—Bench—

Millers Falls	15¢ 10%
Morrill's	No. 1, \$10.00 50¢
Morrill's	No. 2, \$12.50 50¢

Door—

Chapin-Stephens Co. 50¢ 50&10%

Plane—

Chapin-Stephens Co. 20%

Straps—Box—

Acme Embossed, case lots. 20&10&10%

Cary's Universal, case lots. 20&10&10%

Stretchers, Carpet—

Cast Iron, Steel Points. doz. 55¢

All Steel Socket. doz. \$2.00 @ \$2.25

Excelsior Stretcher and Tack Hammer Combined. doz. \$6.00 50%

Stuffers, Sausage—

Enterprise Mfg. Co. 20¢ 25&7 1/2%

National Specialty Co., list Jan. 1, 1902 40&10&5%

P. S. & W. Co. 40&10&5%

Sweepers, Carpet—

Bissell Carpet Sweeper Co. doz.

Triumph, Fancy Veneer. \$36.00

Parlor Queen, Fig. Rosewood. \$30.00

Elite, Hungarian Ash. \$29.00

Am. Queen, Fig. Mahogany. \$27.00

Ideal, Bird's-Eye Maple. \$25.00

Grand Rapids, Nickel. \$24.00

Japan \$22.00

Standard, Nickel. \$21.00

Crown Jewel, Nickel. \$21.00; Jap. \$19.00

Crystal, Glass Top. \$36.00

Grand, 17 in. wide. \$36.00

Parlor Grand. \$48.00

Club, 24 in. wide. \$54.00

Hall, 28 in. wide. \$60.00

NOTE.—Rebates: 50¢ per dozen on three dozen lots; \$1 per dozen on five dozen lots; \$2 per dozen on ten dozen lots; \$2.50 per dozen on twenty-five dozen lots.

Tacks, Finishing Nails, &c.

American Carpet Tacks. 90¢ 40%

American Cut Tacks. 90¢ 40%

Suedes' Cut Tacks. 90¢ 40%

Suedes' Upholsterers'. 90¢ 50%

Gimp Tacks. 90¢ 50%

Lace Tacks. 90¢ 50%

Trimmers' Tacks. 90¢ 40%

Looking Glass Tacks. 65¢

Bill Posters' and Railroad Tacks. 90¢ 50&10%

Hungarian Nails. 80¢ 80%

Finishing Nails. 70%

Trunk and Clout Nails. 90¢ 10%

NOTE.—The above prices are for straight weights.

Miscellaneous—

Double Pointed Tacks. 90¢ 65 tens @—%

Tanks, Oil and Gasoline—

Wilson & Friend Co. Oil

Gal. Gasoline \$3.00

30 \$2.75

60 \$3.50

120 \$5.00

Tapes, Measuring—

American Asses' Skin 50¢ @—%

Patent Leather. 25¢ 30&45%

Steel \$3 1-3&5%

Chesterman's 25¢ 25&45%

Keuffel & Esser Co. 40&10&50%

Favorite, Ass Skin. 40&10&50%

Favorite, Duck and Leather. 25&50&25&10%

Metallic and Steel, lower list. 35¢ 35&5%; Pocket, 35¢ 35&5%

Lufkin's 40&10&50%

Asses' Skin. 30¢ 20&45%

Patent Bend, Leather. 25¢ 50&25&10%

Pocket 40¢ 40&5%

Steel 33¢ 33&35%

Wiebusch & Hilger 25%

Chesterman's Metallic, No. 34L. 25%

Chesterman's Steel, No. 1038L. 25%

etc. 25%

Teeth, Harrow—

Steel Harrow Teeth, plain or headed, 1/2-inch and larger. per 100 lbs. \$2.75 @ \$3.00

Thermometers—

Tin Case, Cabinet, Flange, Dairy, etc. 30¢ 33 1/2%

Ties, Bale—Steel Wire—

Single Loop. 82 1/2¢ 10%

Monitor, Cross Head, etc. 70¢ 7 1/2%

Tinner's Shears, &c.—

See Shears, Tinner's, etc.

Tinware—

Stamped, Japanese and Pieced, sold very generally at net prices.

Tire Benders, Upsetters, &c.

See Benders and Upsetters, Tire.

Tools—Coopers'—

L. & I. J. White. 20¢ 20&5%

Haying—

Myers' Hay Tools. 45%

Miniature—

Smith & Hemenway Co.'s, David-son, doz. Nickel Plated. \$1.50;

Gold Plated. \$2.00

Saw—

Atkins' Cross Cut Saw Tools. 35&5%

Simonds' Improved. 33 1/2%

Simonds' Crescent. 33 1/2%

Ship—

L. & I. J. White. 25%

Transom Lifters—

See Lifters, Transom.

Traps—Fly—

Balloon, Globe or Acme, doz. \$1.15 @ \$1.25; gro. \$11.50 @ \$12.00

Harper, Champion or Paragon, doz. \$1.25 @ \$1.40; gro. \$13.00 @ \$13.50

Game—

Imitation Oneida. 75¢ 10%

Newhouse 65¢ 10&5%

Hawley & Norton. 65%

Victor 75¢ 75&10%

Oneida Community Jump. 50%

Hector 75¢ 75&10%

Mouse and Rat—

Mouse, Wood, Choker, doz. holes 12¢

Mouse, Round or Square Wire. doz. 85¢ 49¢

Marty French Rat and Mouse Traps (Genuine):

No. 1, Rat, doz. \$13.25. \$11.50 doz.

No. 2, Rat, doz. \$6.50. \$5.75 doz.

No. 3, Rat, doz. \$5.25. \$4.70 doz.

No. 4, Mouse, doz. \$3.85. \$3.00 doz.

No. 5, Mouse, doz. \$3.00. \$2.25 doz.

Oneida Community:

Out of Sight, Mouse, doz. \$0.60

Out of Sight, Rat, doz. 1.25

Easy Set, Mouse, doz. 1.35

Easy Set, Rat, doz. 1.00

Wood Choker, Rat, doz. holes. 12

Premier Tin Choker, 5 hole, doz. traps. 75

Trowels—

Disston Brick and Painting. 25%

Disston Plastering. 20%

Disston "Standard Brand" and Ger-

den Trowels. 30%

Kohler's Steel Garden Trowels, gro. 5 in. \$4.80; 6 in. \$4.80.

Never-Break Steel Garden Trowels. gro. \$2.00

Woodrough & McParlin, Plastering. 25%

Trucks, Warehouse, &c.—

B. & L. Block Co.:

New York Pattern. 50&10%

Western Pattern. 40&10%

Handy Trucks. doz. \$18.00

Grocery doz. \$15.00

McKinney Trucks. each, net \$10.00

Model Stove Trucks. doz. \$18.50

Tubs, Wash—

Morr's list, price per gross.

No. 0 1 2 3

Galvanized \$67 \$79 \$89 \$99 10¢ 10%

Twine, Miscellaneous—

Flax Twine:

No. 9, 1/4 and 1/2-lb. Balls. 21¢ 23¢

No. 12, 1/4 and 1/2-lb. Balls. 19¢ 21¢

No. 18, 1/4 and 1/2-lb. Balls. 16¢ 18¢

No. 24, 1/4 and 1/2-lb. Balls. 15¢ 17 1/2¢

No. 36, 1/4 and 1/2-lb. Balls. 15¢ 17¢

Chalk Line, Cotton 14-lb. Balls 22¢ 29¢

Cotton Mops, 6, 9, 12 and 15 lb. to doz. 8 1/2¢ 19¢

Cotton Wrapping, 5 Balls to lb. according to quality. 13 1/2¢ 19¢

American 2-Ply Hemp, 1/4 and 1/2-lb. Balls. 12 1/2¢ 15¢

American 3-Ply Hemp 1-lb. Balls. 13 1/2¢ 16¢

India 2-Ply Hemp, 1/4 and 1/2-lb. Balls (Spring Twine). 7 1/2¢ 9¢

India 3-Ply Hemp, 1-lb. Balls. 7 1/2¢ 9¢

India 3-Ply Hemp, 1 1/2-lb. Balls. 7¢ 8 1/2¢

2, 3, 4 and 5-Ply Jute, 1-lb. Balls. 9¢ 11¢

Mason Line, Linen, 1/2-lb. Bls. 47¢

No. 26 1/2 Mattress, 1/4 and 1/2-lb. Balls, according to quality. 30¢ 60¢

Wool, 3 to 6 ply. B 6¢; A 7 1/2¢

Vises—

Solid Box. 50¢ 50¢ 10¢ 5%

Parallel—

Athol Machine Co.:

Simpson's Adjustable. 40%

Standard 40%

Amateur 25%

Columbian Hdw. Co. 40%

Fisher & Norris Double Screw, net, each, Nos. 2, \$10.50; 3, \$18.00; 4, \$20.50; 5, \$27.00.

Fulton Mach. & Vise Co.:

Reed, Swivel. 25%

Star, Solid Jaw. 50%

Holland's:

Machinists' 40¢ 40&5%

Keystone 65¢ 50¢ 70%

Lewis Tool Co.:

Adjustable Jaw. 30%

Monarch, 50%; Solid Jaw. 50%

Massey Vise Co.:

Climber 40%

Perfect, 15%; Lightning Grip. 15%

Merrill's 20%

Millers Falls Oval Slide Pattern. 60¢ 10%

Parker's:

Victor. 20¢ 25%

Vulcan's 40¢ 45%

Combination Pipe. 55¢ 60%

Prentiss 20¢ 25%

Rock Island 25%

Snediker's X. L. 33 1/2%

Stephens' 33 1/2%

Saw Filers

Disston's D 3 Clamp and Guide. 30

doz. \$24.00, 30%; Clamps. 30%

Perfection Saw Clamps, doz. \$4.50

Reading 60%

Wood Workers—

Fulton Mach. & Vise Co.:

Reed 25%

Star 40%

Massey Vise Co.:

Lightning Grip, 15%; Perfect. 15%

Wyman & Gordon's Quick Action, 9 in. \$6.00; 9 in. \$7.00; 14 in. \$8.00.

Miscellaneous—

Holland's Combination Pipe. 60¢ 60&5%

Massey's Quick Action Pipe. 40%

Parker's Combination Pipe. 40%

87 Series, 60%; 187 Series, 60&5%; No. 870 40%.

Rock Island Pipe. 25%

Wads—Pricel per M.

B. E., 11 up. 60¢

B. E., 9 and 10. 70¢

B. E., 8. 80¢

B. E., 7. 80¢

P. E., 11 up. \$1.00

P. E., 9 and 10. 1.25

P. E., 8. 1.50

P. E., 7. 1.50

Ely's B. E., 11 and larger. \$1.70 @ 1.75

Ely's P. E., 12 to 20. \$3.00 @ 3.25

Ware, Hollow—

Cast Iron, Hollow—

Stove Hollow Ware:

Enameled 45¢ 10%

Ground 50¢ 5%

Plain or Unground. 60%

Country Hollow Ware, per 100 lbs. \$3.00

White Enameled Ware:

Maslin Kettles. 65¢ 10%

Covered Ware:

Tinned and Turned. 35¢ 10%

Enameled 45¢ 10%

See also Pots, Glue.

Enameled—

Agate Nickel Steel Ware. 35 1/2%

Iron Clad Ware. 70&10%

Lava and Volcanic, Enameled. 40&10%

Tea Kettles—

Galvanized Tea Kettles:

Inch. 6 7 8 9

Each 45¢ 50¢ 55¢ 65¢

Steel Hollow Ware—

Avery Spiders and Griddles. 65¢ 65&5%

